

出國報告（出國類別：其他）

2013 年美國地球物理聯合會 秋季大會

服務機關：交通部中央氣象局

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派赴國家：美國

出國期間：民國 102 年 12 月 08 日至 12 月 15 日

報告日期：民國 103 年 01 月 08 日

摘要

參與這次在美國舊金山舉行的 2013 年美國地球物理聯合會秋季大會 (American Geophysical Union, 2013 Fall Meeting)，主要目的是希望透過會議參與的機會，推廣本局所建置的地球物理資料管理系統 (Geophysical Database Managemet System, GDMS)，並且與各界進行意見交流。此外，也藉由參加會議的機會，了解目前世界上，地球物理的主要研究方向及議題。以下即就參與這次國際會議所汲取之經驗做一簡單之彙整：(1) 目前，最主要提供世界各地地震資料的單位就屬 USGS (U. S. Geological Survey) 與 IRIS (Incorporated Research Institution for Seismology)，他們已可在網路上建置方便的資料分享機制。未來，本局 GDMS 若要推廣至國際上，相對應的網路資料分享機制也需再做改進；(2) 其他國際上主要地震觀測資料的提供單位，除了提供觀測資料外，同時也提供一些加工過後的資料，讓使用者能更方便快速的獲得資訊，以評估再進一步分析的可行性；(3) 地震資料除了觀測地震所產生的訊號外，也有不少研究以地震儀對大氣現象進行追蹤；(4) 目前，世界各地有許多的地動 (tremor) 研究，這些研究與傳統的地震監測方法差異甚大，但其資料卻有利於研究震前或地下構造的活動特性；(5) 目前世界各地已有許多的地震站與極大量的地震訊號，人工處理這些觀測資料，曠日費時。本次會議中可發現有許多自動化地震監測的程式，可協助進行地震監測的工作；(6) 國際研討會是快速獲取最新技術資訊非常好的場所，因此建議本局可以適時在國內舉辦國際研討會，邀請國際上的專家至國內報告與交流。

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一、目的

美國地球物理聯合會秋季大會是由美國地球物理協會（American Geophysical Union, AGU）主辦，此會議固定於每年的 12 月於舊金山舉行（圖 1.1）。該會主要目的是提供一個機會，讓世界各國從事地球物理相關研究的學者們，可於公開的場合進行研究發表與討論。該會議的規模可說是地球物理相關學門中，最大型的年度會議。2013 年與會的人士，數目約有 20,000 人，每日發表的文章數目也約有 4,000 篇。可想而知，參加這類型會議可有效益的與外界交流研究結果。

此次，本人除了參與會議外，也於會議中，發表關於本局地震測報中心業務相關之論文。此論文的内容主要是介紹本局地震測報中心的地球物理資料管理系統-Geophysical Database Management System, GDMS（圖 1.2）。此系統蒐錄地震測報中心的各種觀測資料，如地震波、地震震源參數、自由場與結構物的地震響應、地殼變形、地下水等。此系統是建構在網路的平台上，利用網路的便利性，讓使用者可以更方便且迅速的獲得此系統的觀測資料，讓珍貴的觀測資料能更有效率的廣泛提供給學術研究單位進行科學研究。由此可知，該系統對於學術研究上的價值。

AGU FALL MEETING

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圖 1.1、「2013 AGU FALL MEETING」宣傳網頁，資料摘自
<http://fallmeeting.agu.org/2013/>。

T51A-2454
The Geophysical Database Management System in Taiwan
 Hsin-Chieh Pa (pa@scm.cwb.gov.tw); Tray-Chyn Shin; Chien-Hsin Chang; Peih-Lin Leu
 Central Weather Bureau, Taipei, Taiwan

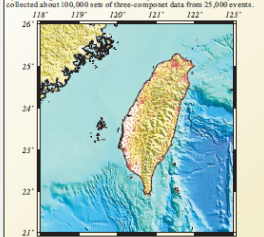
<http://gdms.cwb.gov.tw/index.php>
 Geophysical Database Management System
 地球物理資料庫管理系統

Abstract

The Geophysical Database Management System (GDMS) is an integrated and web-based open data service which has been developed by the Central Weather Bureau (CWB), Taiwan R. O. C. since 2005. This service went online on August 1, 2008. It provides six types of geophysical data acquired from the Central Weather Bureau Seismographic Network, Free-field Strong-motion Station, Strong-motion Array in Building, Global Positioning System, Groundwater Observation System, and Geomagnetic Station. When utilizing the GDMS website, users can download seismic event data and continuous geophysical data. At present, many researchers have accessed this public platform to get numerous geophysical data. It goes without saying that the establishment of GDMS is significant improvement in data sorting for interested researchers.

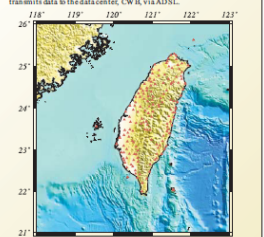
Free-Field Strong-Motion Station

There are over 700 strong-motion stations (red triangles in the below figure) operating under the auspices of an instrumentation project named the Taiwan Strong Motion Instrument Program (TSMIP). This system is assigned to record complex waveforms of hazard earthquakes. Thus, these stations are equipped with accelerometers with a full scale of $\pm 2g$ and a dynamic range of 96 db or 118 db. In the past two decades, this system has collected about 100,000 sets of three-component data from 20,000 events.



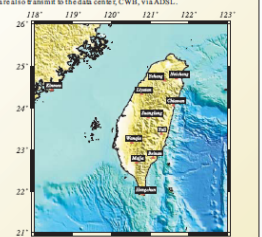
Global Positioning System

The CWB started operating permanent and continuous GPS stations in 1993. Presently, about 150 continuous GPS stations (red triangles in the below figure) are installed on the island of Taiwan and its surrounding islets. The instrument of each station not only records continuous and high resolution (2 samples per 1 minute) data but also transmits data to the data center, CWB, via ADSL.



Geomagnetic Observation System

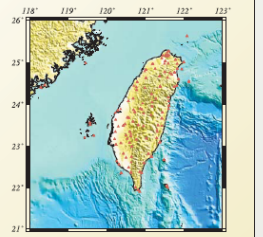
To investigate subsurface structure and precursory signal before damaging earthquake, this system was established in 2006. This system is formed by 11 geomagnetic station located in Taiwan and around its surrounding islets in the below figure). The sampling rate of observed signal is set one point per minute. To monitor efficiently, these geomagnetic signals are also transmit to the data center, CWB, via ADSL.



Central Weather Bureau Seismographic Network

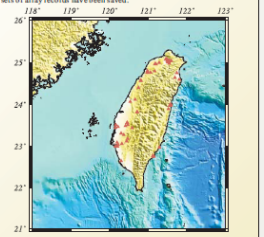
The Central Weather Bureau Seismographic Network (CWBSN) is the main seismic monitoring network in Taiwan. It is composed of about 150 seismic stations (red triangles in the below figure) and maintained by the Central Weather Bureau (CWB) and Institute of Earth Sciences, Academia Sinica, Taipei, Taiwan (IES). Among these seismic stations, about 50 stations are equipped with broadband sensor. Besides, there are about 10 stations whose sensor was installed in the borehole. In addition, one ocean bottom seismometer was set in the northeastern Taiwan in 2011. All of these stations transmit real-time ground motion to the data center of CWB or IES. Based on the observed data from the CWBSN, the local and regional seismicity could be detected completely in the Taiwan area.

The seismic data of CWBSN involves with seismic event-based and continuous data. In terms of seismic events, abundant local and regional earthquakes have been recorded. At present, about 500,000 seismic events have been collected in the catalog of CWBSN since 1989. These events are stored up either the information of hypocenter or seismic waveforms. In terms of continuous data, the ground motion of each station have been also stored up since 2003.



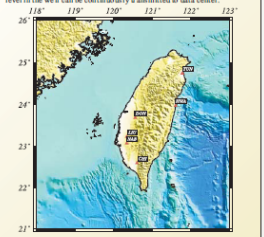
Strong-Motion Array in Building

This array is used to assess the damage of buildings after a damaging earthquake. To provide vibration building response data for scientific and engineering communities, the CWB installed 69 strong-motion arrays in the pre-constructed public buildings beginning in 1992. In general, each site is set at least 20 accelerometers. Until now, over 3,000 events and 10,000 sets of array records have been saved.



Groundwater Observation System

The groundwater observation system in Taiwan started to collect the ground water level in the aquifer in 2004. This real time system composed of six well stations installed in southwestern and eastern Taiwan (Red triangles in the below figure). The well depths are about 100-200 meter to reach the aquifer in situ. Then the 1 Hz data of water level in the well can be continuously transmitted to data center.



Contributions and Policy

The GDMS has a significant improvement in geophysical data sorting for interested researchers. This system collects different kinds of continuous and event-based geophysical data. These geophysical data are provided for the researchers who own the membership of the GDMS. To simplify these data request for the members of GDMS, the GDMS was developed by the CWB as a web-based data service platform (<http://gdms.cwb.gov.tw/index.php>). To enhance the value of data using, the request and service of these abundant data are free of charge for these members. Recently, many researchers joined in the member of GDMS, and the data request increased significantly (the below figure).

Now, the policy of GDMS membership is provided for seismological or geophysical researchers who are Taiwanese. As mentioned before, the data request and service are free of charge for the member of GDMS. In fact, the charge of data and/or services is paid by special project expenses funded by the National Science Council, Taiwan. For this reason, the membership is open for the Taiwanese.

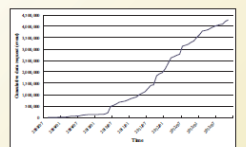


圖 1.2、本次會議的展示海報。其內容包含 GDMS 中各資料系統的測站分布與 GDMS 的資料申請量統計。

二、過程

職於 102 年 12 月 8 日搭乘晚間 11 點 40 分華航 CI004 班次的飛機赴美，由於班機調度問題，延至隔日凌晨 1 時許起飛，到達美國舊金山的時間為當地時間已是晚上 9 時許，離開機場後，直接搭乘地鐵到市區，再步行約 10 分鐘的路程至下榻旅館入住，此時已近晚上 11 時，再整理會議相關資料。在美期間，舊金山當地的天氣氣溫一般都在 10°C 上下，氣候宜人。由於當地近海，常偶有降雨。幸運的是，參加會議的這一段時間，天氣十分晴朗，會議進行得很順利。由於職的研究工作之範疇多集中在地震、地下構造與火山研究部分，因此，主要關注的議程項目會集中於此 3 類。

12 月 9 日為第 1 日的議程。由於前日到達舊金山時已是夜間 11 時，故在參與會議前，需先領取各項資料，包含個人的識別證（圖 2.1），與申請領取各項繳費的證明等。由於此會議是地球科學相關類別中，規模最大的，與會時可以看到有許多的專業人士依序排隊領取證件的壯觀場面（圖 2.2）。承如前述的，此會議的與會人士眾多，發表的研究報告也十分龐大。因此，大會會於每日早晨，提供報紙，內容為當日的議程（圖 2.3）。而本次與職研究工作之範疇相關的報告，多在 3 棟場館（Moscone South, West, North）中的 South3 樓（圖 2.4、圖 2.5），而海報區則是集中在 South 的 Post Hall（圖 2.6）。

第 1 天的議程中，發現有數篇研究，其內容是颱風所造成的地振動訊號（如圖 2.7 與圖 2.8）。本人覺得相關議題頗為有趣，雖然地表上的大氣研究與地表下的地震活動都屬於地球科學相關的研究，但研究方法差異甚大，能有觀測資料可以試著串聯起這兩大學門，是很棒的一件事。

除此之外，與 GDMS 一樣是提供地震資料的單位，IRIS，它們在網路上所提供的資料，除了地震波形，震源參數外，也提供一些頻譜分析的結果。未來，本局的 GDMS 也許也可朝加工資料的方向前進，讓 GDMS 的網站內容更豐富。

第 1 天的晚上，是大會舉辦的 Ice Break，相對於臺灣的會議，外國會議在餐點招待上都比較簡單。此次的 Ice Break 只有提供汽水，啤酒與一些堅果類的點心。

12月10日第2天議程（議程資料請參考附錄），此日的議程中，有一個主題，*Seismic Anisotropy: Predictions, Observations, and Interpretations*（圖 2.9），雖然相關議題看似與本局的業務相關，但細看其報告，多為大尺度的地球構造研究，與可能造成災害的淺部地殼活動性-本局主要的觀測業務，尺度差異甚大。事實上，本日的議程中，有很多的研究是針對大尺度的地球構造或是板塊運動的科學性研究。

但在第2天的議程中，也有部分議程與本局業務相關，如自動化地震監測與定位等。這些研究，有許多都是在測試中，但可以發現，很多新的自動化監測工作，都是由許多年輕的研究學者所開發。他們所運用的方式，都經過複雜的數學轉換，簡化電腦運算，如圖 2.10。這些研究報告，除了簡化人工在地震監測中所扮演的吃重角色外，也讓本人覺得，未來的地球科學研究，在這些年輕且具有強大程式化能力的研究人員推動之下，地震資訊的取得將可以日趨簡易。

除此之外，也有火山研究相關的海報（如圖 2.11）。一般火山的形成，岩漿來源多半來自隱沒地殼的部分熔融或是上部地函物質漫流至地表。而不同岩漿來源的火山，在地表產生的位置會有所不同。但在這研究中，提出一些可能，說明部分熔融的岩漿，其生成位置可能比原先的理論更廣。

也許是民族性所致，在 AGU 的全日議程中，大會僅會在上午的中場休息時間提供咖啡與下午議程的中場休息時提供軟性飲料與啤酒等（圖 2.12），與臺灣會議所提供的餐點形式差異很大。相較之下，臺灣會議就相對友善熱情多了。

12月11日第3天議程（議程資料請參考附錄），職於本日聽到一些關於誘發地震的一些研究（圖 2.13）。目前，在礦區內，似乎已可以藉由一些模擬，成功的預測一些因注水作用產生的地震（圖 2.14）。雖然目前無法預測天然地震，但似乎也為地震預測開啓了一些可能的未來性。

除此之外，在構造演化的部分，臺灣的造山模式，始終存在許多可能。本次會議中，職發現，在伊朗半島地區，也有研究人員利用深埋再掘起的模式（*exhumation*）進行構造演化的解釋（圖 2.15）。顯示，造山模式與構造演化等之重要性，不止開放的臺灣，連封閉的伊朗也是研究的地區之一。

最後，在海報區，發現到一個特別的研究（圖 2.16），利用環境雜訊逆推速度構造，進而解釋其地下的應力變化。職對於此研究存在許多好奇，原因是其

利用逆推地上構造的研究方法，解析度可能不高。但其研究卻利用相對的一些微小變化，解釋應力的現象。雖然存在很多問題，卻也難以否定其研究成果。也許在未來，本人需要再更增加關注於這一些新舊技術的演進。

12月12日第4天議程（議程資料請參考附錄），本日的議程中，有許多關於 Early Warning 地震預警的相關海報（圖 2.17~圖 2.18）。由於相關研究，非職之專業。因此，本人帶回部分資料，給予本局相關同仁做為參考。其後，又巧遇本局地震中心的外國顧問，吳大銘教授。其給予本局的 GDMS 一些建議。於此同時，也為職引見 IRIS 的技術人員，期望藉由與他們交流的機會，可以使本局的 GDMS 系統更完善。當日近中午時，職有幸與本局地震中心的外國顧問，蔡義本教授，有見面討論的機會。在這次機會中，職與顧問有了很多深入的討論，主要討論的議題方向是臺灣地區的山崩研究。在此次的討論中，本人收益良多，也更確定接下來的研究方向與主軸。到了晚上，臺灣的地科中心在舊金山的四海酒樓舉行了臺灣之夜（Taiwan Night）。在會議中，看到了許多來自臺灣的研究學者，也有機會與他們做一些討論。

12月13日是最後1天議程（議程資料請參考附錄），本日的議程中，有本人的海報展示（圖 2.19）。主要介紹的時間在上午，但由於此時，職還有另一篇共同作者的報告（圖 2.20）。因此，職於上午期間有短暫離開。在整個上午的過程中，有許多國外的學者對於本局的 GDMS 相當有興趣。可惜的是，此系統目前只對臺灣的研究學者有開放。但至少有機會可以讓國外的研究人員知道臺灣有許多寶貴的觀測資料，增加未來更多國際合作的可能。

到了下午，與會的人士減少了，因此，本人有機會可以參觀了一些強地動的研究與一些儀器遲滯效應對於地動訊號的影響模擬及修正（圖 2.21）。

而在會議結束，用膳完畢後，職便收拾行囊，前往機場，搭乘華航 12月14日凌晨的 CI003 的班機返回臺灣，返回臺灣的時間為 12月15日上午。



圖 2.1、職與職之會議識別證。



圖 2.2、大會報到處與領取會議識別證的排隊人潮。

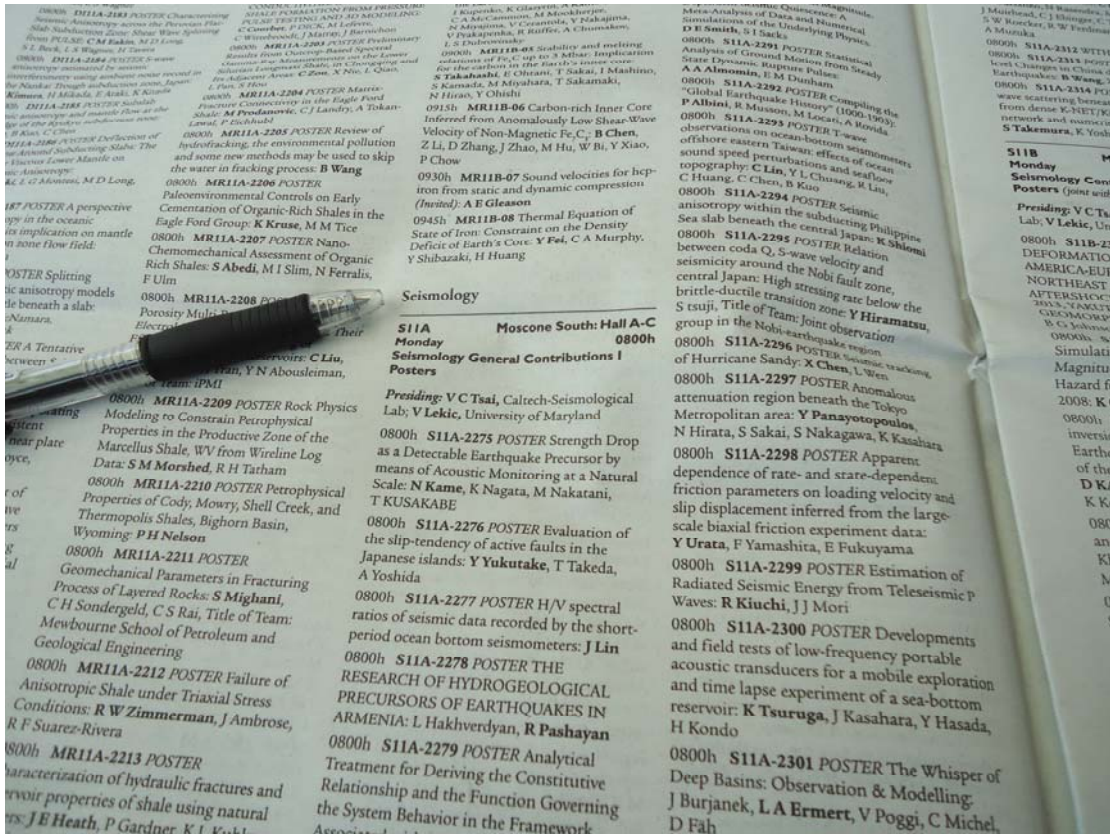


圖 2.3、大會議程的第一日報紙。

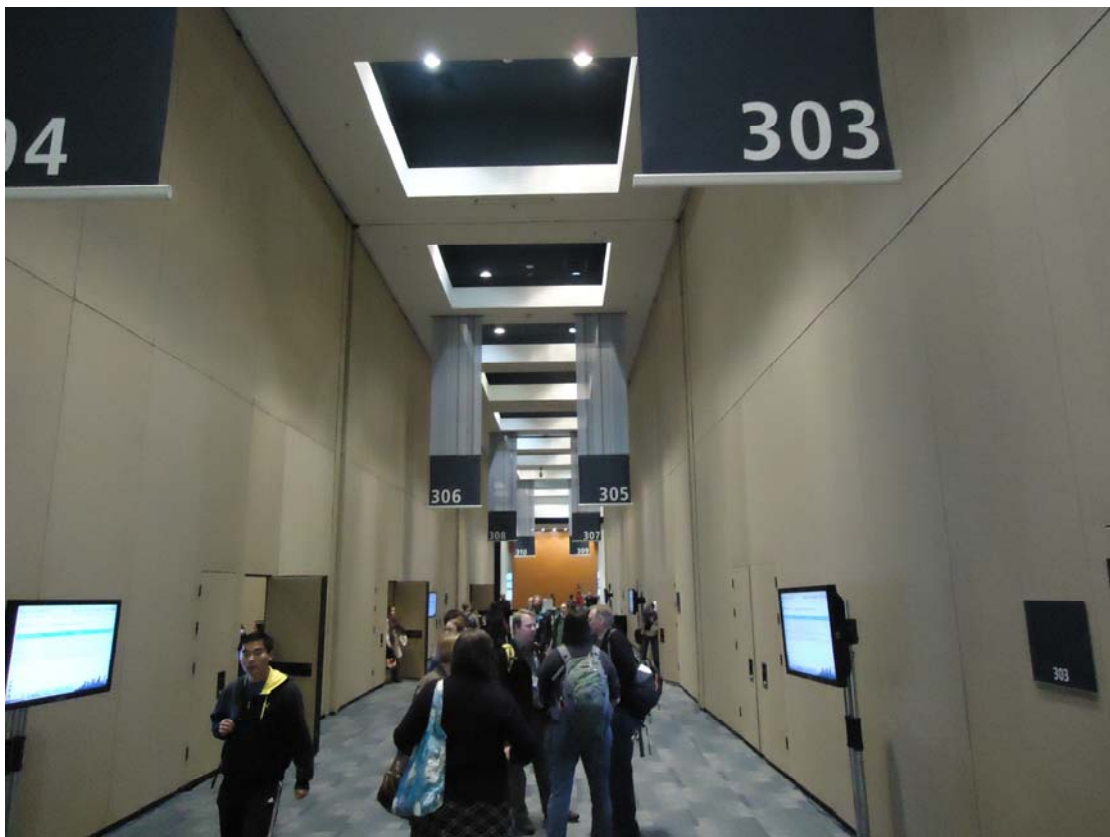


圖 2.4、Moscone South 三樓的幾個會議室。



圖 2.5、Moscone South 三樓的會議室。



圖 2.6、Moscone South 的 Post Hall。

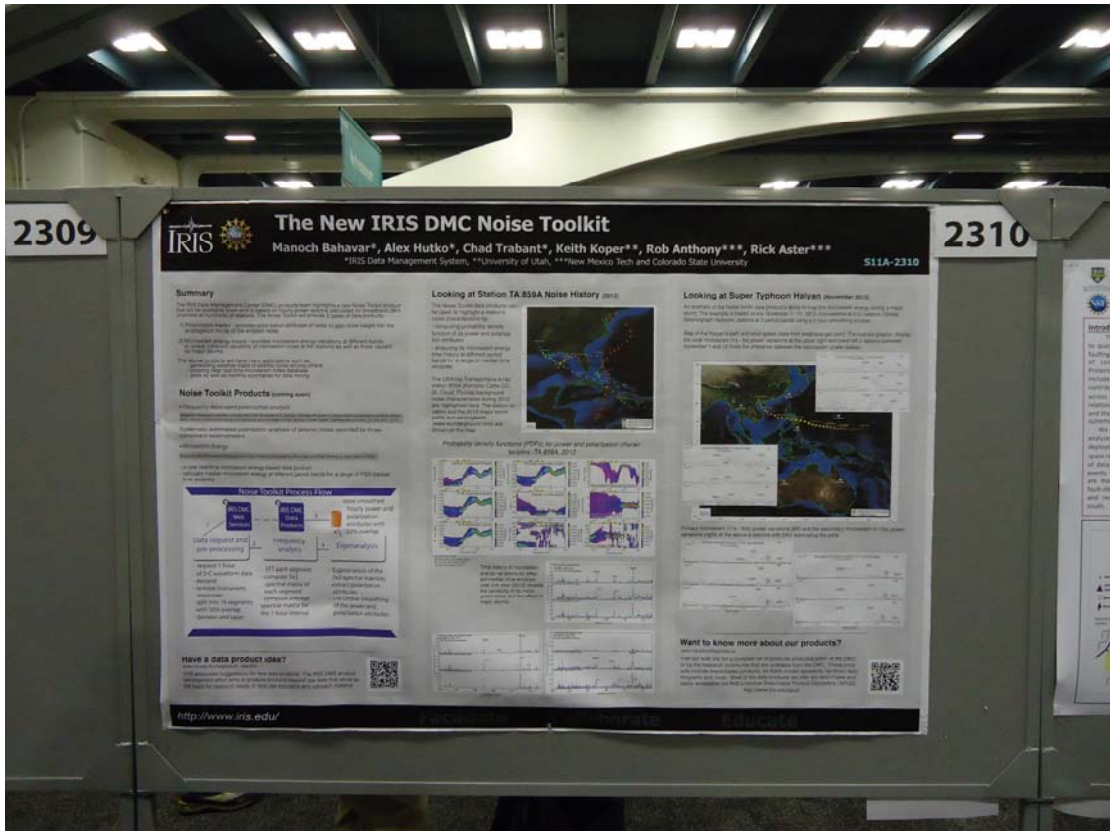


圖 2.7、與會海報 I。

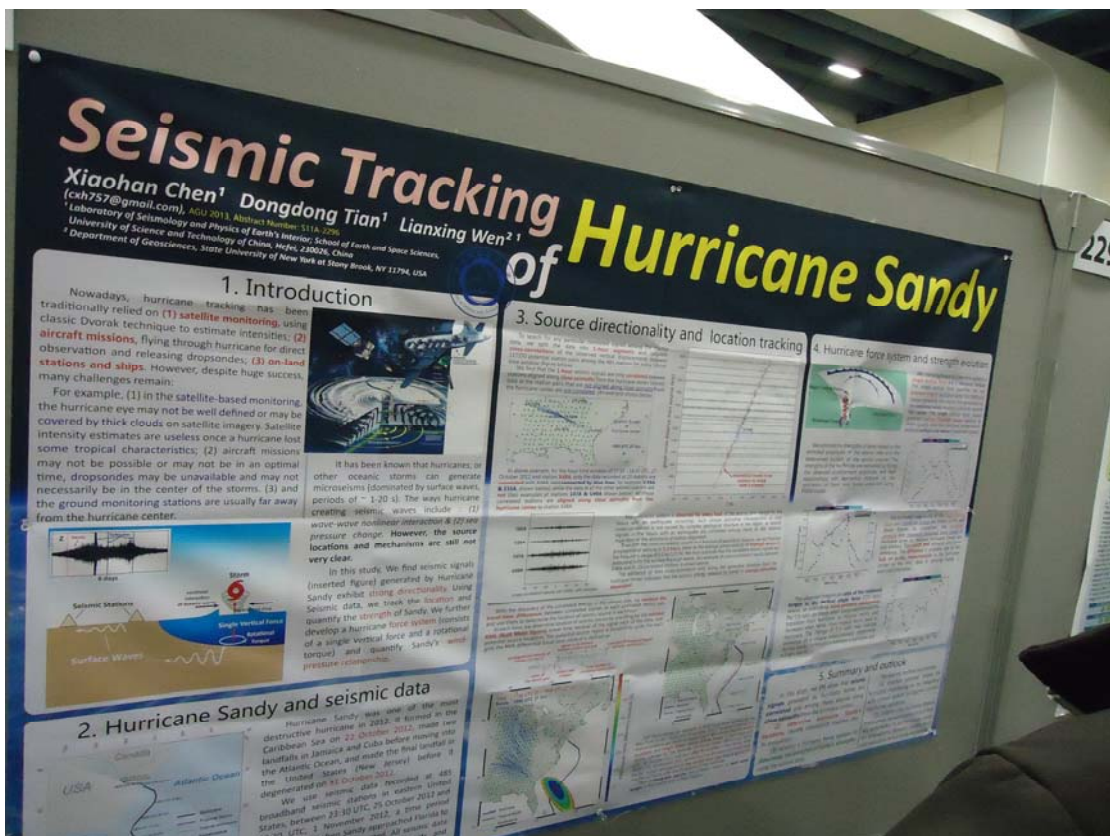


圖 2.8、與會海報 II。

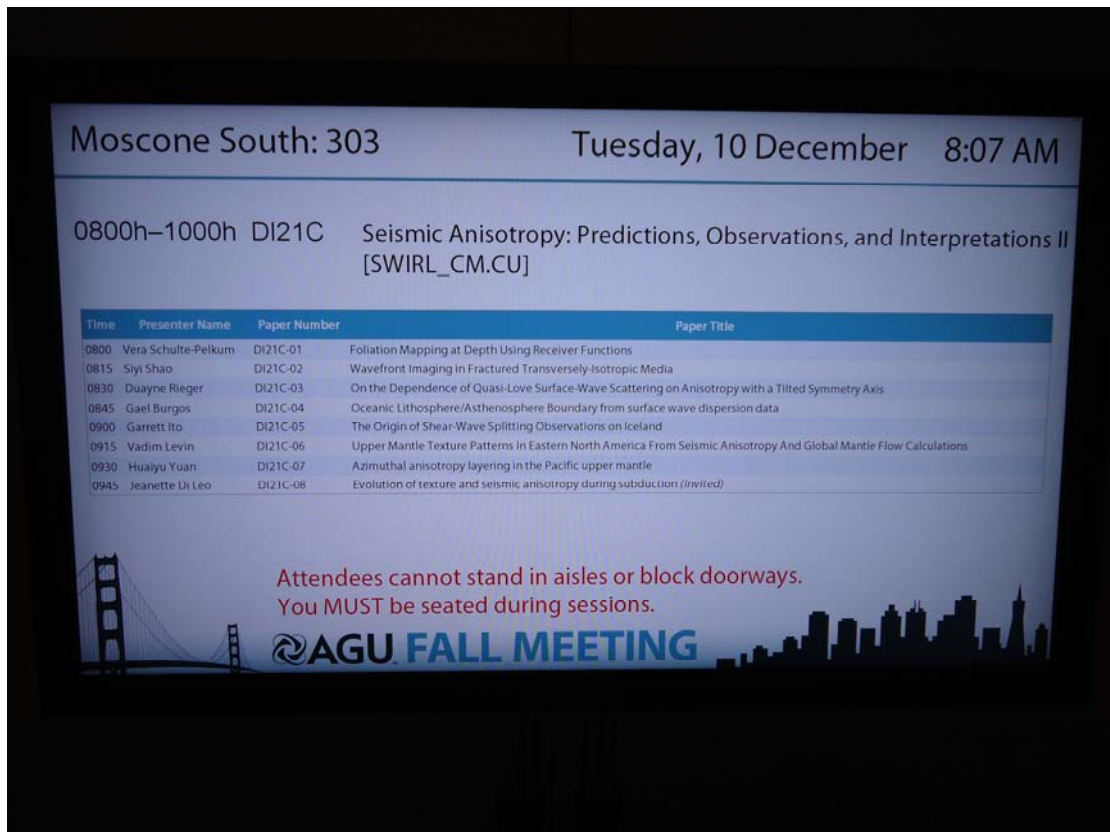


圖 2.9、第二日的部分議程。

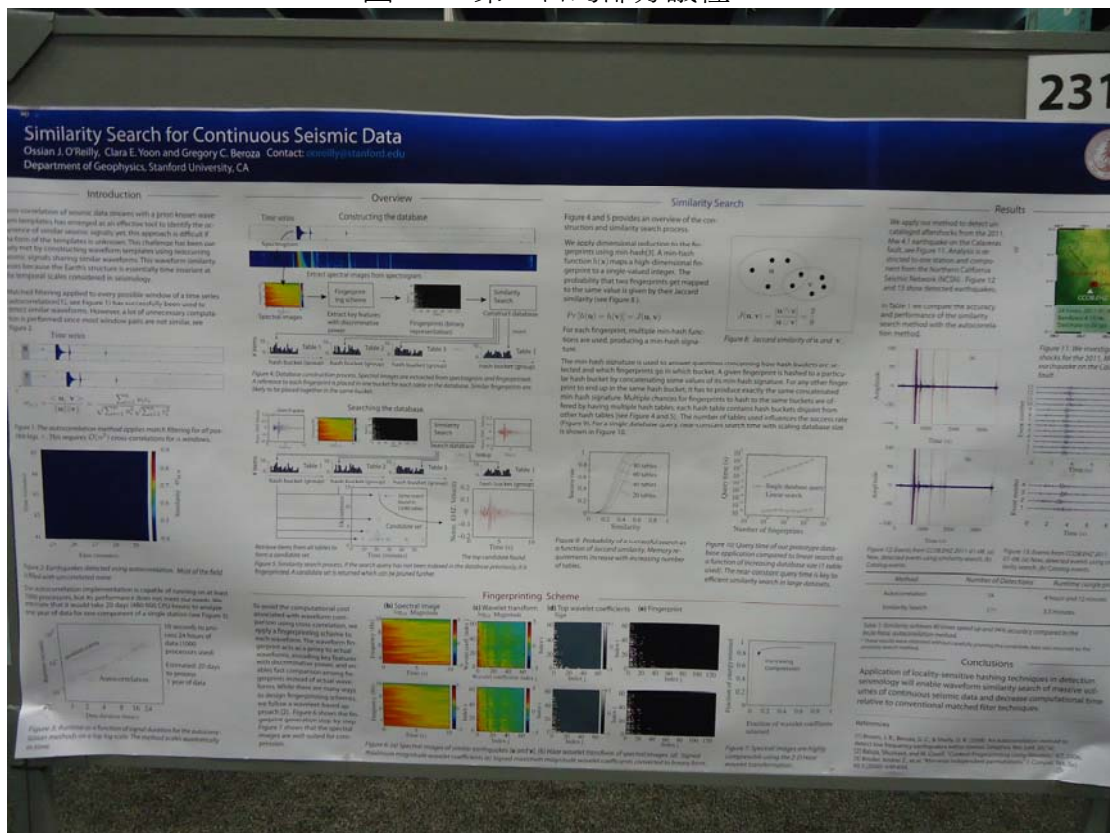


圖 2.10、與會海報 III。

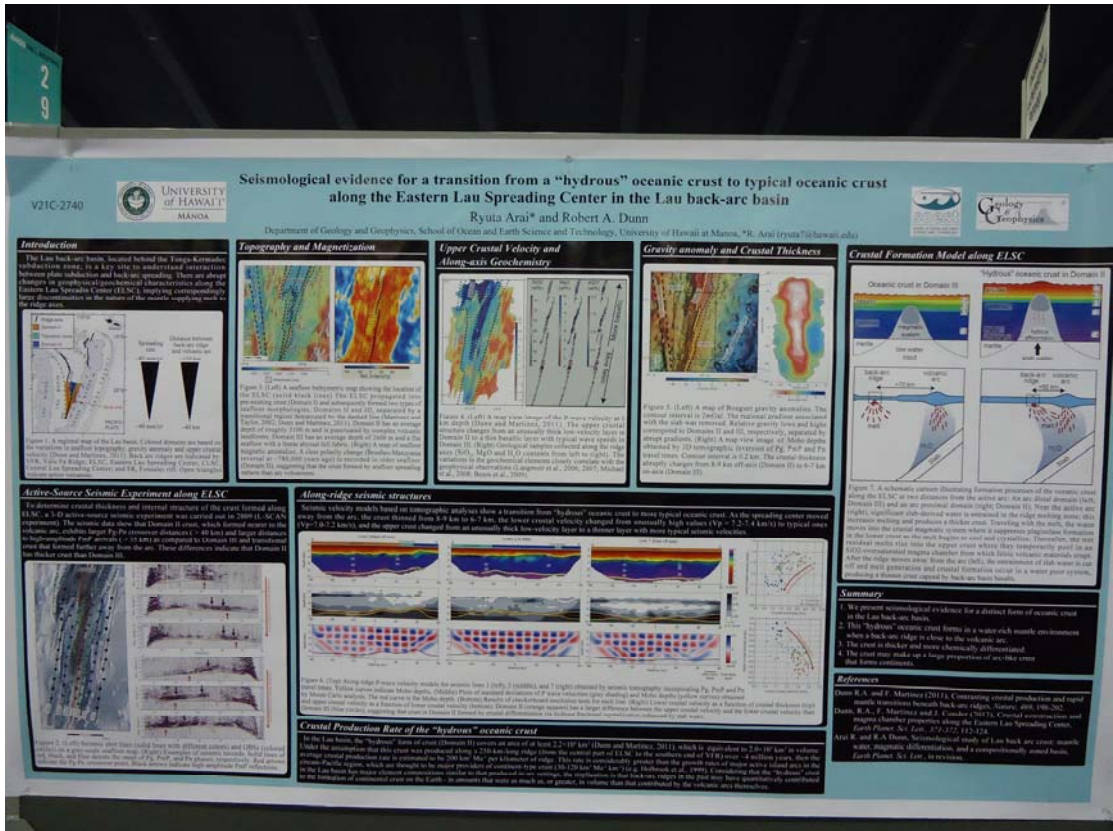


圖 2.11、與會海報 IV。



圖 2.12、會議在下午的中場休息。

0800h-1000h S31F Micro- and Macro-scale Induced Seismicity: Observations and Mechanics I

Time	Presenter Name	Paper Number	Paper Title
0800	Lia Lajole	S31F-01	Seismic response to power production at the Coso Geothermal field, south-eastern CA: using operational parameters and relocated events to study anthropogenic seismicity rates and reservoir scale tectonic structure
0815	Martin Schoenball	S31F-02	Complete Release of Horizontal Shear Stresses During Geothermal Reservoir Stimulation
0830	Toni Kraft	S31F-03	The ML 3.5 earthquake sequence induced by the hydrothermal energy project in St. Gallen, Switzerland.
0845	Valentin Gischig	S31F-04	Coupling induced seismic hazard analysis with reservoir design
0900	Torsten Dahm	S31F-05	The effect of time variable stress shadows on rates of induced seismicity (<i>Invited</i>)
0915	Thomas Goebel	S31F-06	Identifying induced seismicity in active tectonic regions: A case study of the San Joaquin Basin, California
0930	Philip Usher	S31F-07	Insights into fracture development from microseismic attenuation anisotropy
0945	Jonny Rutqvist	S31F-08	Dynamic modeling of seismicity triggered by underground CO2 injection and impact on surface structures and human perception

Attendees cannot stand in aisles or block doorways. You MUST be seated during sessions.

AGU FALL MEETING

圖 2.13、第三日的議程表。

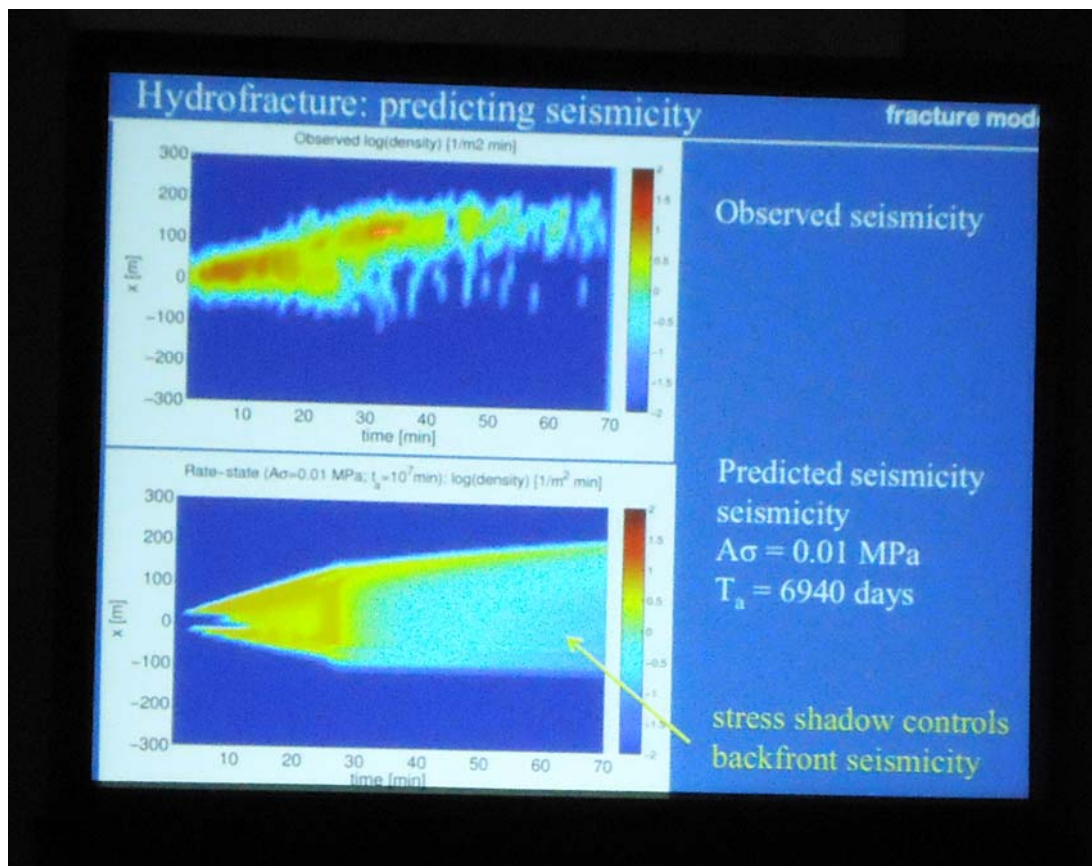


圖 2.14、與會報告 I。

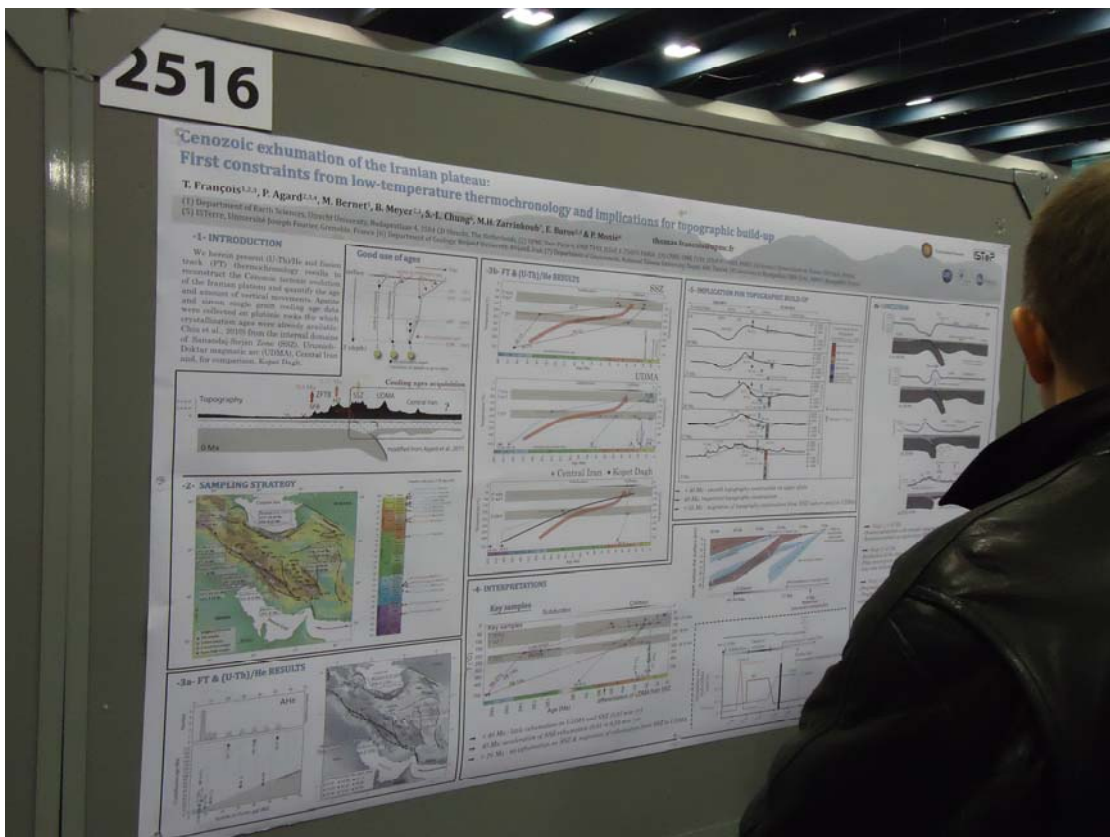


圖 2.15、與會海報 V。

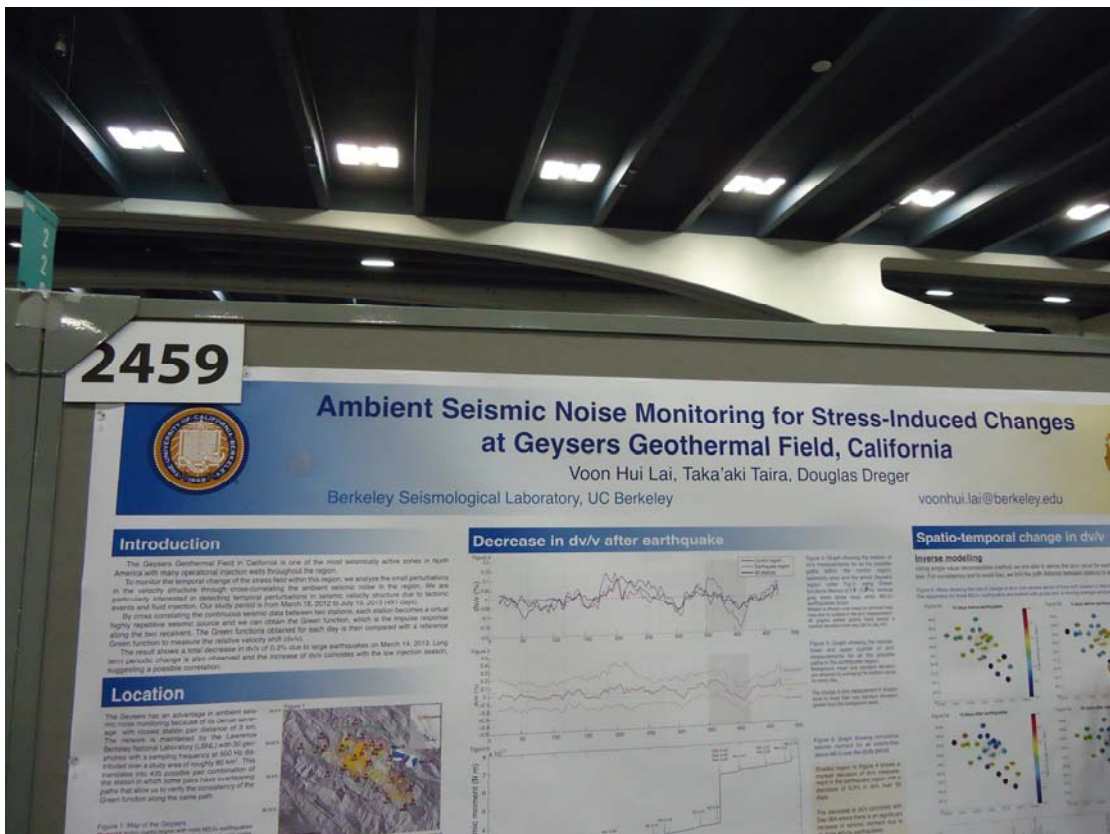


圖 2.16、與會海報 VI。

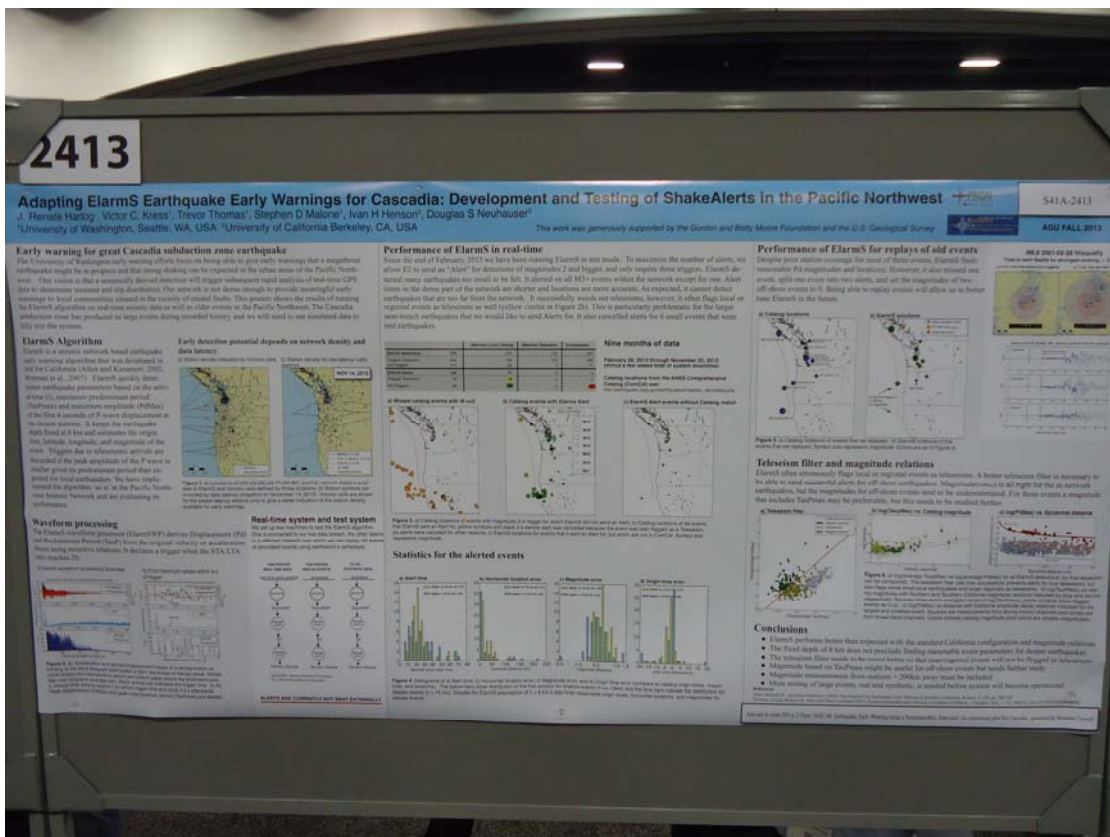


圖 2.17、與會海報 VII。

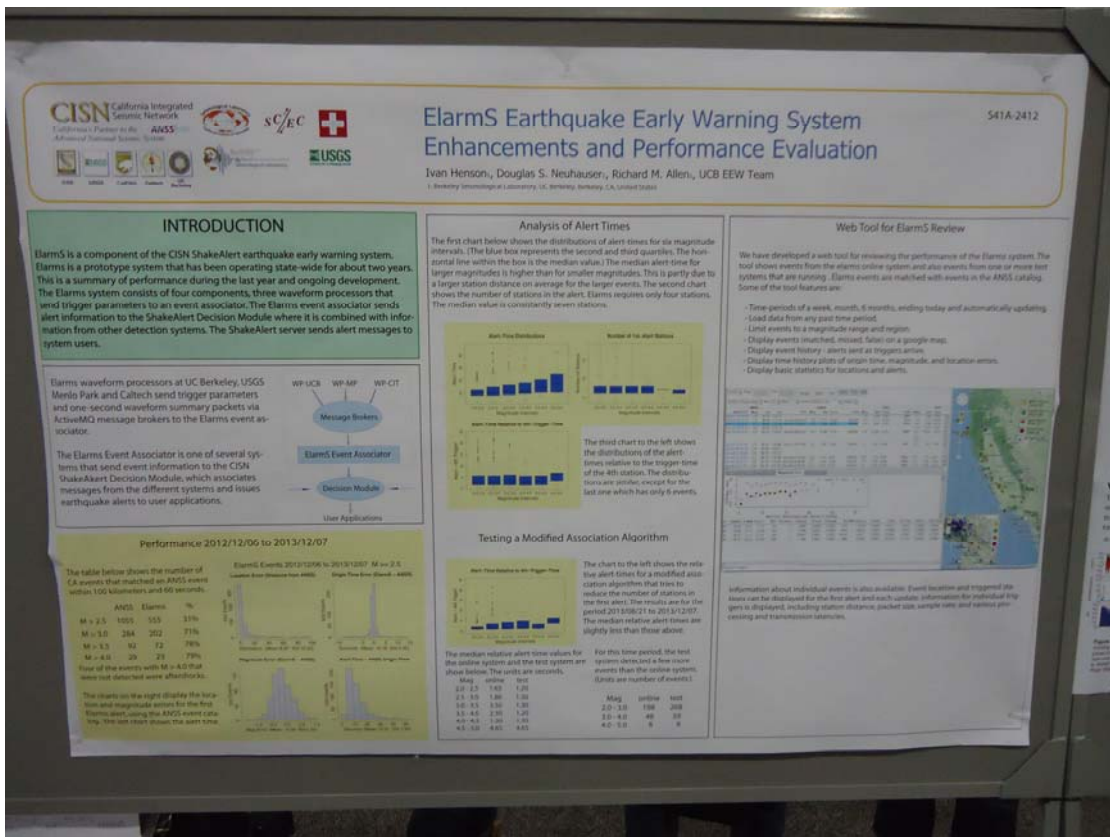


圖 2.18、與會海報 VIII。

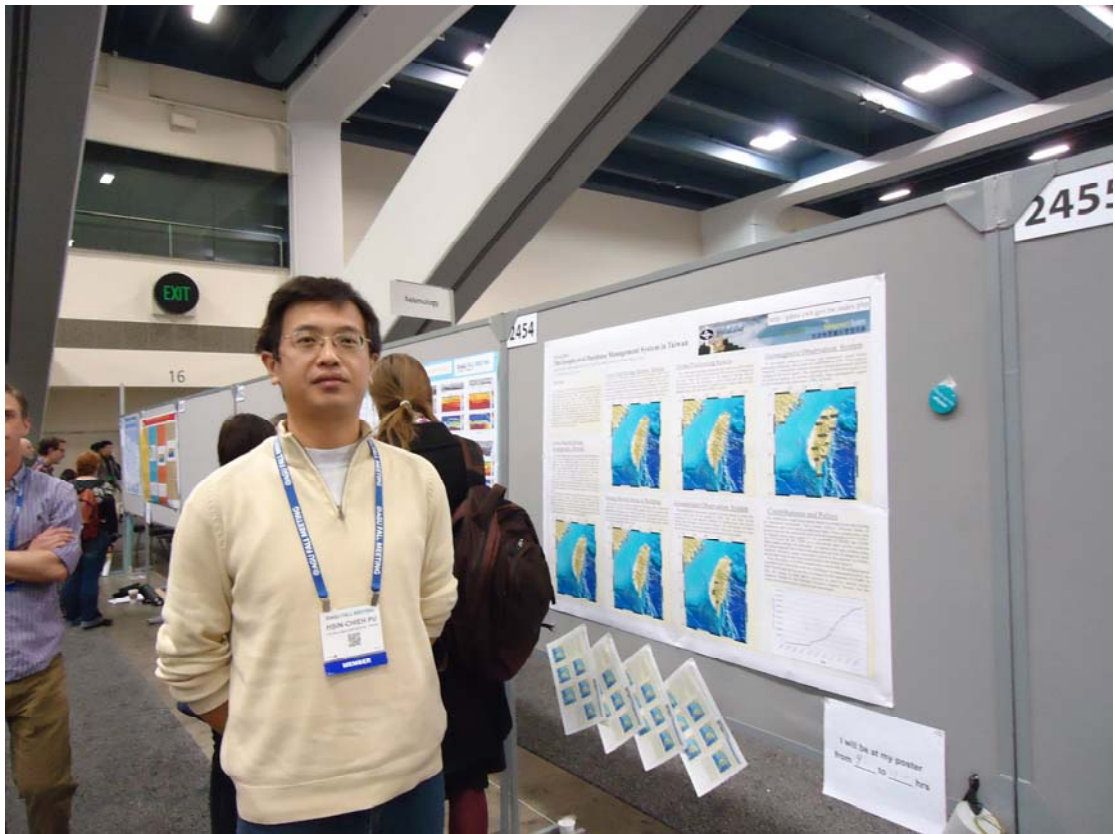


圖 2.19、本人與本人的海報之合照。

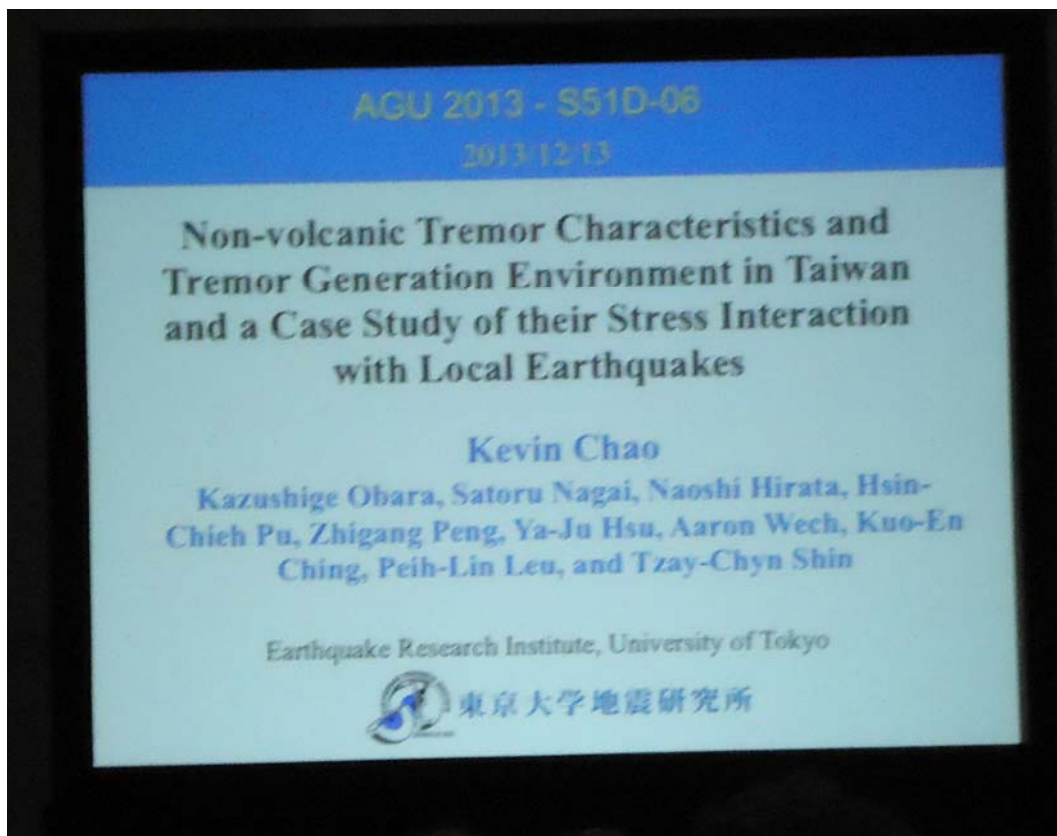


圖 2.20、職的另一共同作者之研究報告。

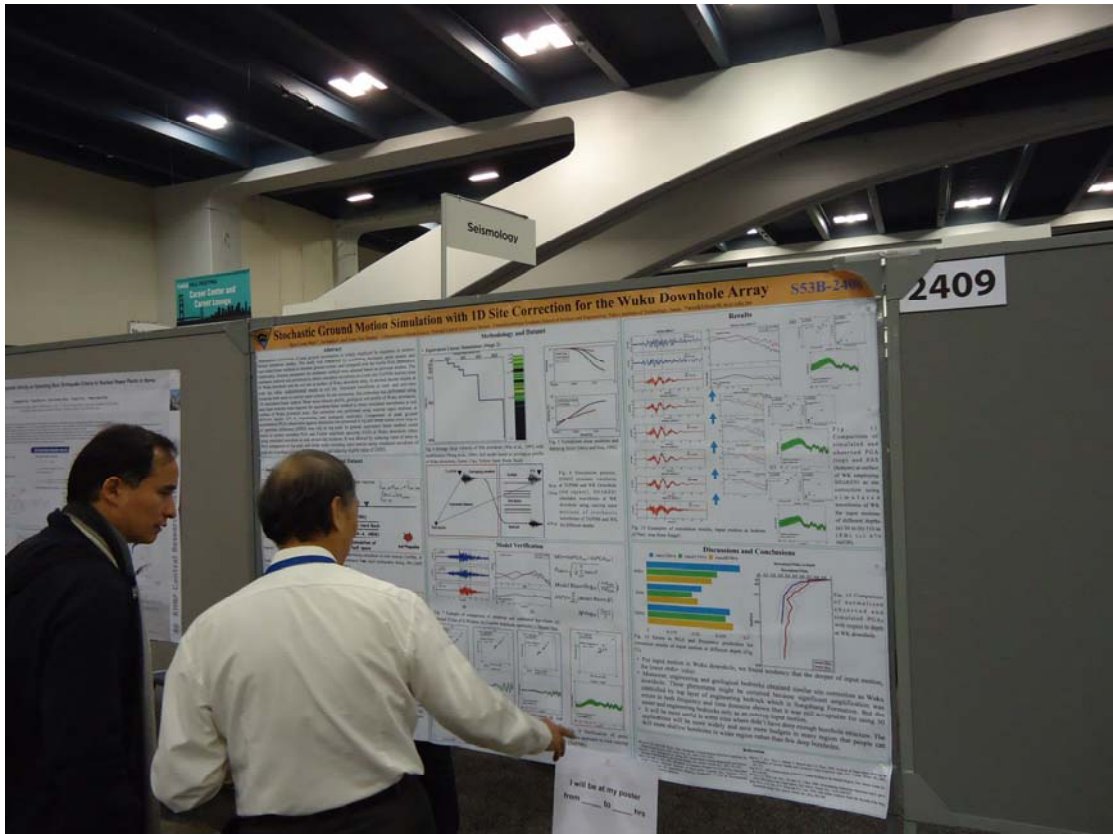


圖 2.21、與會海報 IX。

三、心得

職有機會參加 2013 年的 AGU 秋季會議，感到十分的興奮。畢竟此會議的規模盛大，參加的研究學者也眾多。因此，職能藉此機會了解現在主要的科學議題，甚至是與他們討論和互動，收獲豐碩。

就會議的本質來看，誠如過程所述，每日的議程都十分豐富，不管是十分專精於某一研究方向的專業人士，或是研究範疇涉獵較廣研究學者，在這樣的會議中，皆可有相當的收穫。以本人來說，由於研究主題多以觀測現象的解釋為主。因此，利用這種機會，多方面接觸各種研究，增加知識，對於未來解釋各種觀測現象是十分有利。

由於此會議在國際間具有相當的影響力，因此，才会有如此多的專業人士，選擇在此會議中發表其研究結果。事實上，職於 2010 年時亦曾參與過這個會議。與當時比較，除了近年來有增加手機的 APP 程式，方便與會人士查詢議程外，會議的本質差異並不大。感覺比較強烈的，倒是其參加會議的各項費用，皆有明顯的提高，從會議的論文投稿費到會議的註冊費皆是，累積增加的支出較 2010 年多了有近 70 美元。雖然會議有對某些地區的與會人士有補助，但臺灣並不在其中。由於其費用偏高（以 2013 年來計，投稿費與註冊費合計 495 美元），費用部分可說是此會議的一大缺點。

相較於 AGU 的秋季會議，臺灣每年皆有舉辦的地球物理或地質年會就相對友善多了。雖然臺灣自行舉辦的會議，內容和規模皆難以與 AGU 秋季會議相提並論。但會議的形式，其實差異不大。相反的，臺灣的學術研究會，註冊費與餐點之提供，皆優於 AGU。因此，如果經費不足的研究人員或是學生，本人十分建議其可以試著先多參與國內的會議。

另一方面，此次參加會議時，發現到 2013 年的 AGU，有很濃的中國味。在 2010 年時的 AGU，雖然與會的人士中也有不少中國人。但這次（2013 年）的會議，感覺更強烈。除了一般的研究人員外，還有不少年紀較輕的研究生參與其中。也許是近年來大陸的經濟愈來愈好，研究生參與會議的機會也增加了。

就研究方面的心得來看，國際上，其它提供觀測資料的單位，如 USGS 和 IRIS 等，它們有更完善的網頁介面可提供給使用者，本局若也有意朝類似的方

向前進的話。那麼，未來若能與其接觸與合作，也許可以使本局的 GDMS 在國際上的能見度更高。當然，在資料的提供上，除了原始的觀測資料外，也可仿照它們的模式，提供一些加工的資料，如頻譜特性或地震走時圖等。讓使用者能更方便快速的獲得資訊，以評估再進一步分析的可行性。

與會的那幾天，看到了一些新的研究類型和方向。例如：地震資料除了觀測地震所產生的訊號外，也有不少研究以地震儀對大氣現象進行追蹤；以地動（tremor）的觀測，探討地下構造的活動性，甚至是探尋其與地震前兆的關係；還有自動化地震監測的研究，可以大量節省人工與增加研究效率等。事實上，會議中還有很多有趣和前端的研究，職難以盡述，但在其中，最大的感想便是，國際研討會是快速獲取最新技術資訊非常好的場所。

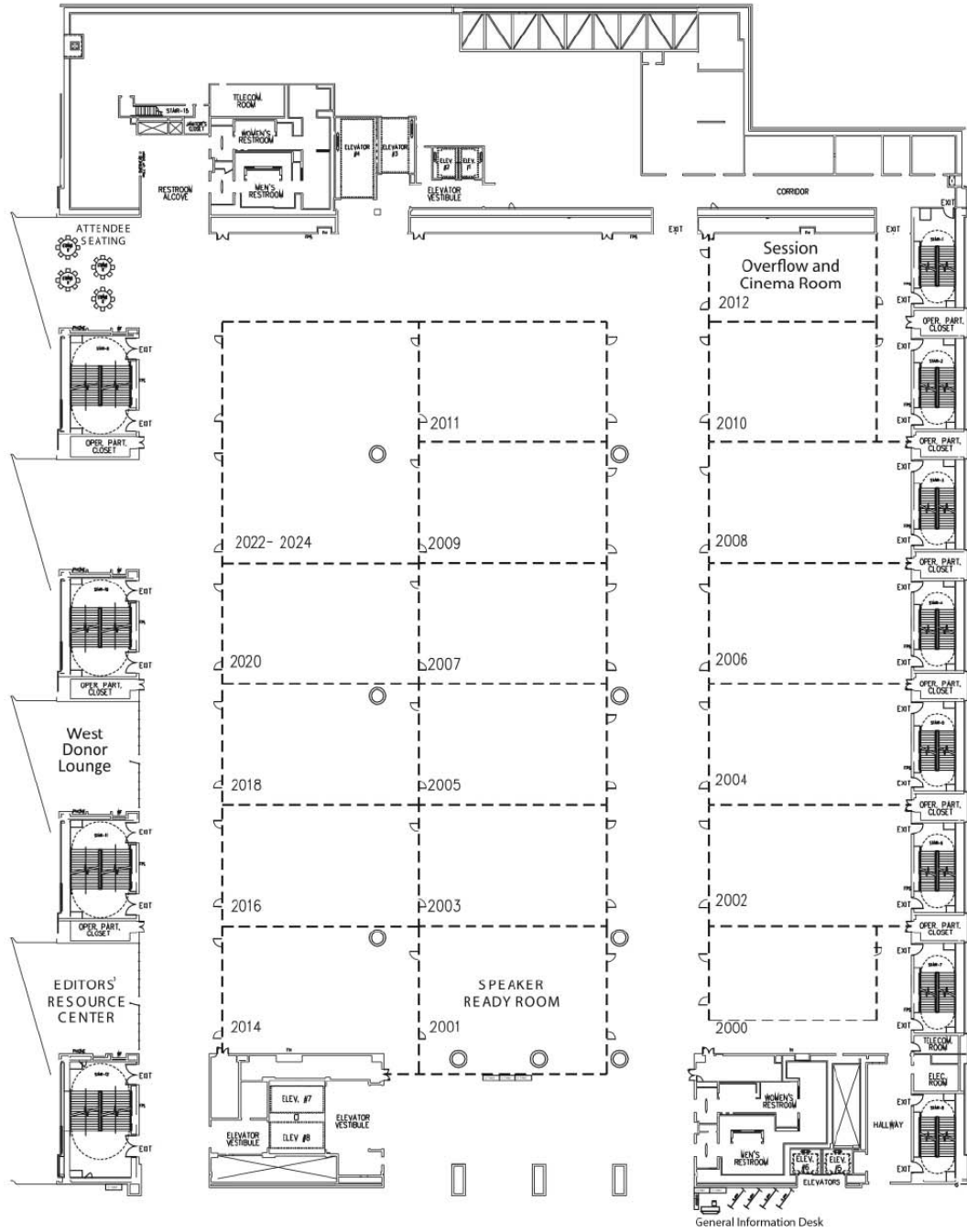
四、建議事項

職在參與完這次會議後，感覺受益良多，尤其在新知識的增廣部分。有了更多的知識背景與見聞之後，相信對於未來的研究工作，勢必有相當之助益。以下即為本人參加 2013 年的 AGU 秋季會議後的幾點建議：

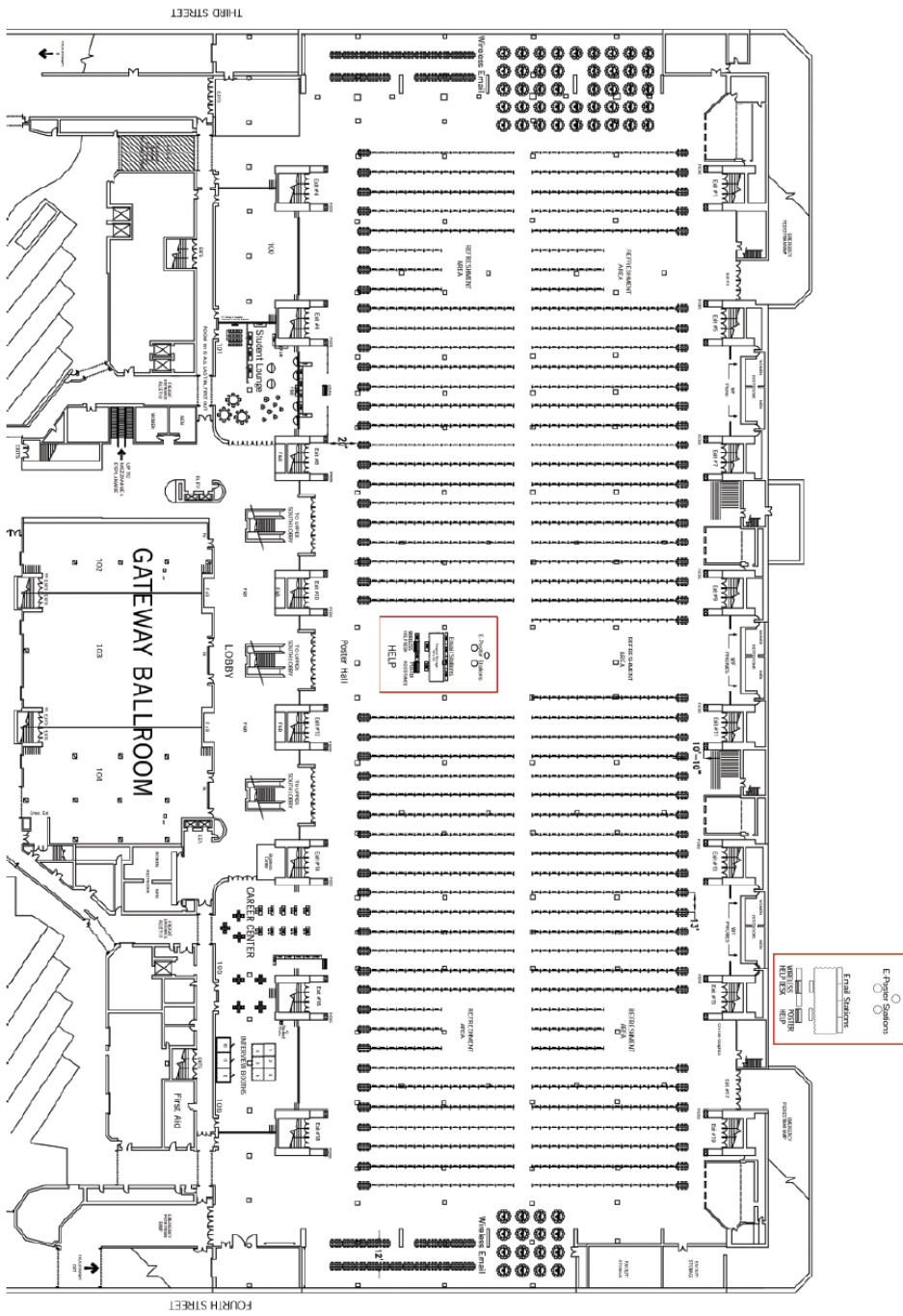
1. 此種類型的國際研討會，提供一個平台，讓世界各地的研究人員得以有交流的機會。未來，如果本局的工作業務欲與世界接軌，在經費允許下，十分建議可以善加利用這種國際研討會的機會，吸取新知與交流。
2. 本局的 GDMS 系統設計之初衷為分享觀測資料，由於此介面與程式的撰寫皆由本局同仁自行開發，甚是辛苦。未來，若能與其他有經驗的單位合作，不但有機會可以減少本局同仁的工作量，同時，亦有機會可以吸取他人之相關經驗。
3. 由於臺灣位在地震發生的頻繁區內，而本局的任務，就是觀測臺灣地區的地震活動，目前已觀測到的地震資料量極為廣大；未來，可想而知，隨著觀測品質的提高，觀測量只會愈來愈多。因此，未來朝向半自動或全自動化的地震監測工作，應該是避免不了的。所以，建議本局可以開始逐步接觸相關於地震監測自動化的研究工作。

附錄、研討會場地與議程

MOSCONE WEST LEVEL TWO



MOSCONE SOUTH POSTER HALL



- Session Sponsors & Cosponsors**
- Oral Session
 - Poster Session
 - ⊙ Swirl Session
 - ▲ Cosponsored by AMS
 - ✦ Cosponsored by EGU-GMPV
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|--|--|--|---|
| U Union
A Atmospheric Sciences
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B Biogeosciences
C Cryosphere
ED Education and Human Resources
EP Earth and Planetary Surface Processes | G Geodesy
GC Global Environmental Change
GP Geomagnetism and Paleomagnetism
H Hydrology
IN Earth and Space Science Informatics
NG Nonlinear Geophysics
NH Natural Hazards | NS Near Surface Geophysics
OS Ocean Sciences
P Planetary Sciences
PA Public Affairs
PP Paleoclimatology and Paleodimatology
SI Societal Impacts and Policy Sciences
SA SPA-Aeronomy | SH SPA-Solar and Heliospheric Physics
SM SPA-Magnetospheric Physics
DI Study of the Earth's Deep Interior
MR Mineral and Rock Physics
S Seismology
T Tectonophysics
V Volcanology, Geochemistry, and Petrology |
|--|--|--|---|

		Session Start Time												Location														
		Tuesday A.M.												Oral Session														
		Earth and Planetary Surface Processes												Poster Session														
		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V
EP21A	Coastal Geomorphology and Morphodynamics: Beaches and Barrier Islands II																											
Geodesy																												
G21A	Pushing the Frontiers of Geodesy: Detection of New Phenomena Through Advances in Geodetic Time Series Analysis and Corrections I Posters																											
G21B	The Application of Wavelets in Geodesy Posters																											
G21C	Mass Transport and Mass Distribution in the Earth System I																											

Swirl Session

Session Number. A session number designates the section, or other sponsoring group, and chronology of the presentation.

Example: A21C = Atmospheric Sciences, Tuesday, A.M., concurrent session C

Day	Time	Concurrent Session
1 = Monday	1 = AM	A
2 = Tuesday	2 = AM	B
3 = Wednesday	3 = PM	C
4 = Thursday	4 = PM	D
5 = Friday	5 = Evening	

<p>Session Sponsors & Cosponsors</p> <ul style="list-style-type: none"> ○ Oral Session ● Poster Session ⊙ Swirl Session ▲ Cosponsored by AMS ✦ Cosponsored by EGU-GMPV * Cosponsored by IAS ◇ Cosponsored by MSA 	<p>U Union</p> <p>A Atmospheric Sciences</p> <p>AE Atmospheric and Space Electricity</p> <p>B Biogeosciences</p> <p>C Cryosphere</p> <p>ED Education and Human Resources</p> <p>EP Earth and Planetary Surface Processes</p>	<p>G Geodesy</p> <p>GC Global Environmental Change</p> <p>GP Geomagnetism and Paleomagnetism</p> <p>H Hydrology</p> <p>IN Earth and Space Science Informatics</p> <p>NS Nonlinear Geophysics</p> <p>NH Natural Hazards</p>	<p>NS Near Surface Geophysics</p> <p>OS Ocean Sciences</p> <p>P Planetary Sciences</p> <p>PA Public Affairs</p> <p>PP Paleoenvironment and Paleoclimatology</p> <p>SI Societal Impacts and Policy Sciences</p> <p>SA SPA-Aeronomy</p>	<p>SH SPA-Solar and Heliospheric Physics</p> <p>SM SPA-Magnetospheric Physics</p> <p>DI Study of the Earth's Deep Interior</p> <p>MR Mineral and Rock Physics</p> <p>S Seismology</p> <p>T Tectonophysics</p> <p>V Volcanology, Geochemistry, and Petrology</p>
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Monday A.M.

			A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V
SPA-Aeronomy																													
SA11A	Data Assimilation in Space Sciences Posters	8:00 A.M.																					●						
SA11B ⊙	Impacts of Cosmic Dust in Planetary Atmospheres I Posters	8:00 A.M.	●																										
SA11C	Equatorial Ionospheric Electrodynamic Processes and Transient Phenomena I Posters	8:00 A.M.																●											
SPA-Solar and Heliospheric Physics																													
SH11A	Physical Processes in the Heliosheath: From Global to Micro Scales Posters	8:00 A.M.																											
SH11B	Voyager Leaves the Heliosphere? Posters	8:00 A.M.																											
SH11C	Solar and Heliospheric Physics General Contributions I: Solar Wind	8:00 A.M.																											
SPA-Magnetospheric Physics																													
SM11A	Magnetospheric Physics General Contributions: Magnetospheric Processes Posters	8:00 A.M.																											
SM11B	Probing Magnetospheric Dynamics With Multipoint Measurements and Simulations Posters	8:00 A.M.																											
SM11C	Asymmetric Magnetic Reconnection I Posters	8:00 A.M.																					○						
SM11D	Case Studies in Storm-Time Electrodynamics and Ionosphere-Thermosphere Response Posters	8:00 A.M.																					○						
SM11E	Magnetospheres Throughout the Solar System I Posters	8:00 A.M.																					○						
Study of Earth's Deep Interior																													
DI11A ⊙	Seismic Anisotropy: Predictions, Observations, and Interpretations Posters	8:00 A.M.																							●	●	●	●	●
Mineral and Rock Physics																													
MR11A	Subsurface Science and Engineering of Shale Posters	8:00 A.M.																											
MR11B	Chemistry and Physics of Earth's Lower Mantle and Core I Posters	8:00 A.M.																							○				
Seismology																													
S11A	Seismology General Contributions I Posters	8:00 A.M.																											
S11B	Seismology Contributions: Seismicity Posters	8:00 A.M.																								●	●	●	●
S11C	Understanding the Cascadia Subduction Zone: Contributions From the Cascadia Initiative and Multidisciplinary Studies I Posters	8:00 A.M.																									○	○	○

		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V	
Monday A.M.																													
S11D	Progress in the Research of the 2008 Ms8.0 Wenchuan and 2013 Ms7.0 Lushan Earthquakes I	8:00 A.M.	Moscone South: 307																										
Tectonophysics																													
T11A	Continent-Continent Suture I Posters	8:00 A.M.	Moscone South: Hall A-C																										
T11B	Deep Exploration Into the Lithosphere I Posters	8:00 A.M.	Moscone South: Hall A-C																										
T11C	Deep Exploration Into the Lithosphere II Posters	8:00 A.M.	Moscone South: Hall A-C																										
T11D	The Pacific-North America Plate Boundary Through Time: Translation, Rotation, Erosion, and 4-D Strain I Posters	8:00 A.M.	Moscone South: Hall A-C																										
T11E	Circum-Arctic Lithospheric Evolution I	8:00 A.M.	Moscone South: 302																										
T11F	Continental Rifts and Rifted Margins I	8:00 A.M.	Moscone South: 304																										
Volcanology, Geochemistry, and Petrology																													
V11A	Fluids in Slabs: Chemical and Physical Studies of Volatile-Bearing Minerals in Subduction Zones I ▲	8:00 A.M.	Moscone South: 310																										
V11B	Geochronology, Correlation, and Climatic Significance of Widespread Volcanic Ash Layers I →	8:00 A.M.	Moscone South: 306																										
V11C	Ocean Islands and Large Igneous Provinces I	8:00 A.M.	Moscone South: 303																										
V11D	Volcanism in California: Geophysics, Geology, and Geochemistry of the Young and the Restless I	8:00 A.M.	Moscone South: 308																										
Atmospheric Sciences																													
A12A ●	Climate Sensitivity and Feedbacks: Advances and New Paradigms II ▲	10:20 A.M.	Moscone West: 3010																										
A12B ●	From Air Pollution to Climate Changes in Asia II ▲	10:20 A.M.	Moscone West: 3008																										
A12C ●	Remote Sensing of CO ₂ and CH ₄ : From Missions to Science—Geostationary Observations II ▲	10:20 A.M.	Moscone West: 3006																										
A12D	Tropical and Midlatitude Convective Storm Systems and Their Roles in Weather and Climate II ▲	10:20 A.M.	Moscone West: 3012																										
Atmospheric and Space Electricity																													
AE12A II	Lightning and Atmospheric Electricity in Thunderstorms II	10:20 A.M.	Moscone West: 3004																										
Biogeosciences																													
B12A	Biosphere-Atmosphere Greenhouse Gas Fluxes in Terrestrial Ecosystems II	10:20 A.M.	Moscone West: 2002																										
B12B	Carbon Transformations in Hydrothermal Systems I	10:20 A.M.	Moscone West: 2000																										
B12C	Emerging Frontiers in Biogeosciences II	10:20 A.M.	Moscone West: 2006																										
B12D ●	Vulnerability of Permafrost Carbon to Climate Change I	10:20 A.M.	Moscone West: 2004																										
Cryosphere																													
C12A	Physical and Chemical Air-Snow-Ice Interactions: From the Micro to the Global Scale II	10:20 A.M.	Moscone West: 3005																										

Monday A.M.		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V
Earth and Space Science Informatics																												
IN12A	Data Curation, Credibility, Preservation, Implementation, and Data Rescue to Enable Multisource Science II	10:20 A.M.				○																						
Nonlinear Geophysics																												
NG12A	Non-Gaussian and Nonlinear Aspects of Data Assimilation/Fusion and Predictability I (Virtual Option)	10:20 A.M.	○													○												
Ocean Sciences																												
OS12A	Fluid Conduits and Biogeochemical Impacts of Sub-seabed Carbon Storage (CCS) Leakage II	10:20 A.M.																										
OS12B	Frontier Science From Extended Continental Shelf Studies I	10:20 A.M.																										
Planetary Sciences																												
P12A	Atmospheric Escape, Upper Atmospheres, Ionospheres, and Plasma Interactions at Mars and Venus I	10:20 A.M.	○																									
P12B	Mercury After Two Years of MESSENGER Orbital Observations II	10:20 A.M.																										
Public Affairs																												
PA12A	Assessing Socioeconomic Benefits of Earth Observation Science I (Virtual Option)	10:20 A.M.																		○								
Paleoceanography and Paleoclimatology																												
PP12A	Beyond the Last Glacial Period: Characteristics, Impacts, and Forcing of Millennial-Scale Climate Variability II	10:20 A.M.																										
PP12B	Sensitivity of Peatland Carbon Balance to Climate Change: Past and Future II	10:20 A.M.																										
SPA-Aeronomy																												
SA12A	GNSS/GPS-Based Ionospheric-Space Weather Monitoring I	10:20 A.M.																										
SPA-Solar and Heliospheric Physics																												
SH12A	First Results From the Interface Region Imaging Spectrograph (IRIS) I	10:20 A.M.																										
SPA-Magnetospheric Physics																												
SM12A	General Contributions: Magnetic Reconnection and Waves/Instabilities I	10:20 A.M.																										
SM12B	Magnetospheres Throughout the Solar System II	10:20 A.M.																										
Mineral and Rock Physics																												
MR12A	Chemistry and Physics of Earth's Lower Mantle and Core II	10:20 A.M.																										
Seismology																												
S12A	Understanding the Cascadia Subduction Zone: Contributions From the Cascadia Initiative and Multidisciplinary Studies II	10:20 A.M.																										
S12B	Progress in the Research of the 2008 Ms8.0 Wenchuan and 2013 Ms7.0 Lushan Earthquakes II	10:20 A.M.																										

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 A Atmospheric Sciences
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 GP Geomagnetism and Palaeomagnetism
 H Hydrology
 IN Earth and Space Science Informatics
 NG Nonlinear Geophysics
 NH Natural Hazards
 N5 Near Surface Geophysics
 O5 Ocean Sciences
 P Planetary Sciences
 PA Public Affairs
 PP Paleogeography and Paleoclimatology
 SI Societal Impacts and Policy Sciences
 SA SPA-Aeronomy
 SH SPA-Solar and Heliospheric Physics
 SM SPA-Magnetospheric Physics
 DI Study of the Earth's Deep Interior
 MR Mineral and Rock Physics
 S Seismology
 T Tectonophysics
 V Volcanology, Geochemistry, and Petrology

Monday A.M.
Tectonophysics

		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SH	SM	DI	MR	S	T	V
T12A	Characterization of Antarctic Geology and Tectonics I																										
T12B	Continental Rifts and Rifted Margins II																										
V12A	The Geoinformatics Revolution: Data-Driven Science, Databases, and Data Systems for Thermodynamics and Geochemical and Geophysical Modeling I ▲ ◆																										
V12B	Deep Crustal Processes in Magmatic Arcs I																										
V12C	Mechanisms of Magma Ascent and Emplacement I †																										
V12D	Ocean Islands and Large Igneous Provinces II																										

Monday P.M.
Union

U12A	AGU Presidential Forum																										
U13A	Global Nuclear Security: The Alliance of International Policy and Science (Virtual Option)																										

Atmospheric Sciences

A13A	Air Quality and Climate in the Southeast U.S. I Posters																										
A13B	Chemical, Physical, and Morphological Properties of Remote Aerosols Posters																										
A13C	Greenhouse Gas Measurements Using Active Optical Remote Sensing I Posters ▲																										
A13D	Sources and Chemistry of Atmospheric Oxidants I Posters																										
A13E	Subseasonal to Seasonal Prediction: Bridging the Gap Between Weather and Climate II Posters ▲																										
A13F	Tropical and Midlatitude Convective Storm Systems and Their Roles in Weather and Climate III Posters ▲																										
A13G	Weather-Driven Renewable Energy II Posters ▲																										
A13H	Climate Sensitivity and Feedbacks: Advances and New Paradigms I ▲																										

Session Sponsors & Cosponsors		Geodesy															
U Union		G Global Environmental Change								Near Surface Geophysics				SH SPA-Solar and Heliospheric Physics			
A Atmospheric Sciences		GC Global Environmental Change		OS Ocean Sciences		SH SPA-Solar and Heliospheric Physics		SM SPA-Magnetospheric Physics		NS Near Surface Geophysics		SI Seismology		SH SPA-Solar and Heliospheric Physics			
AE Atmospheric and Space Electricity		GP Geomagnetism and Paleomagnetism		P Planetary Sciences		SM SPA-Magnetospheric Physics		SH SPA-Solar and Heliospheric Physics		OS Ocean Sciences		SI Seismology		SH SPA-Solar and Heliospheric Physics			
B Biogeosciences		H Hydrology		PA Planetary Sciences		SM SPA-Magnetospheric Physics		SH SPA-Solar and Heliospheric Physics		PA Public Affairs		SI Seismology		SH SPA-Solar and Heliospheric Physics			
C Cryosphere		IN Earth and Space Science Informatics		PP Paleoclimatology and Paleoclimatology		SM SPA-Magnetospheric Physics		SH SPA-Solar and Heliospheric Physics		PP Paleoclimatology and Paleoclimatology		SI Seismology		SH SPA-Solar and Heliospheric Physics			
ED Education and Human Resources		NG Nonlinear Geophysics		SI Societal Impacts and Policy Sciences		SM SPA-Magnetospheric Physics		SH SPA-Solar and Heliospheric Physics		SI Societal Impacts and Policy Sciences		T Tectonophysics		SH SPA-Solar and Heliospheric Physics			
EP Earth and Planetary Surface Processes		NH Natural Hazards		SA SPA-Aeronomy		SM SPA-Magnetospheric Physics		SH SPA-Solar and Heliospheric Physics		SA SPA-Aeronomy		V Volcanology, Geochemistry, and Petrology		SH SPA-Solar and Heliospheric Physics			

Monday P.M.

Session	Description	Time	Moscone West: 2016	A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SH	SM	DI	MR	S	T	V		
SM13E	Probing Magnetospheric Dynamics With Multipoint Measurements and Simulations II	1:40 P.M.	Moscone West: 2016																												
Study of Earth's Deep Interior																															
DI13A	Linking the Earth's Surface With the Deep Interior: Comparing Predictions and Observations of Mantle Plumes I	1:40 P.M.	Moscone South: 303																												
Mineral and Rock Physics																															
MR13A	Advances in Rock Physics and Rock Mechanics: From Faults to Reservoirs I Posters	1:40 P.M.	Moscone South: Hall A-C																												
MR13B	Planetary Impacts and Interiors From Experiments and Theory I	1:40 P.M.	Moscone South: 301																												
Seismology																															
S13A	Progress in the Research of the 2008 Ms8.0 Wenchuan and 2013 Ms7.0 Lushan Earthquakes III Posters	1:40 P.M.	Moscone South: Hall A-C																												
S13B	Seismology General Contributions II	1:40 P.M.	Moscone South: 305																												
S13C	Seismology Contributions: Seismicity II	1:40 P.M.	Moscone South: 307																												
Tectonophysics																															
T13A	Characterization of Antarctic Geology and Tectonics II Posters	1:40 P.M.	Moscone South: Hall A-C																												
T13B	Circum-Arctic Lithospheric Evolution II Posters	1:40 P.M.	Moscone South: Hall A-C																												
T13C	Seismology, Active Tectonics, and Geomorphology in South and East Asia I: Taiwan Posters	1:40 P.M.	Moscone South: Hall A-C																												
T13D	Seismology, Active Tectonics, and Geomorphology in South and East Asia II: Central and SE Asia Posters	1:40 P.M.	Moscone South: Hall A-C																												
T13E	Seismology, Active Tectonics, and Geomorphology in South and East Asia III: Japan Posters	1:40 P.M.	Moscone South: Hall A-C																												
T13F	Continent-Continent Suturing II	1:40 P.M.	Moscone South: 302																												
T13G	Continental Rifts and Rifted Margins III	1:40 P.M.	Moscone South: 304																												
T13H	Deep Exploration Into the Lithosphere III	1:40 P.M.	Moscone South: 306																												
Volcanology, Geochemistry, and Petrology																															
V13A	The Geoinformatics Revolution: Data-Driven Science, Databases, and Data Systems for Thermodynamics and Geochemical and Geophysical Modeling II Posters & ⚡	1:40 P.M.	Moscone South: Hall A-C																												

Monday P.M.		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V
V13B	Deep Crustal Processes in Magmatic Arcs II Posters	Moscone South: Hall A-C																										
V13C	Fluids in Slabs: Chemical and Physical Studies of Volatile-Bearing Minerals in Subduction Zones II Posters →	Moscone South: Hall A-C																										
V13D	Geochronology, Correlation, and Climatic Significance of Widespread Volcanic Ash Layers II Posters →	Moscone South: Hall A-C																										
V13E	Mechanisms of Magma Ascent and Emplacement II Posters →	Moscone South: Hall A-C																										
V13F	Ocean Islands and Large Igneous Provinces III Posters	Moscone South: Hall A-C																										
V13G	Volcanism in California: Geophysics, Geology, and Geochemistry of the Young and the Restless II Posters	Moscone South: Hall A-C																										
V13H	Investigating Volcanic Conduits and Related Processes Through Experiments, Numerical Modelling and Observations I →	Moscone South: 308																										
V13I	Tectonics and Magmatism in the Alaska-Aleutian, Cascadia, and Taupo-Ionga Subduction Systems I →	Moscone South: 310																										
Atmospheric Sciences																												
A14A	Emissions and Impacts of Short-lived Climate Forcers III ▲	Moscone West: 3004																										
A14B Ⓞ	From Air Pollution to Climate Changes in Asia IV ▲	Moscone West: 3008																										
A14C Ⓞ	Marine Trace Gases and Aerosols II ▲	Moscone West: 3010																										
A14D	Research on Improving Weather Prediction for Mountain Terrain III	Moscone West: 3012																										
A14E	Weather-Driven Renewable Energy II ▲	Moscone West: 3006																										
Biogeosciences																												
B14A	Climatic Controls on Net Ecosystem Exchange (NEE) I	Moscone West: 2002																										
B14B	Geomicrobiology of Fe and Mn I	Moscone West: 2006																										
B14C	N ₂ O Fluxes and the Role in Carbon and Nitrogen Cycles: Processes, Measurement, and Modeling II	Moscone West: 2003																										
B14D	Scaling Ecosystem Observations Through Space and Time II	Moscone West: 2000																										
B14E Ⓞ	Vulnerability of Permafrost Carbon to Climate Change III	Moscone West: 2004																										
Cryosphere																												
C14A	Himalayan Glacier Dynamics II (Virtual Option)	Moscone South: 104																										
C14B	Remote Sensing of the Cryosphere III: Microwave Applications	Moscone West: 3005																										

Session Sponsors & Cosponsors	U Union	G Geodesy	NS Near-Surface Geophysics	SH SPA-Solar and Heliospheric Physics
○ Oral Session	A Atmospheric Sciences	GC Global Environmental Change	O5 Ocean Sciences	SM SPA-Magnetospheric Physics
● Poster Session	AE Atmospheric and Space Electricity	GP Geomagnetism and Palaeomagnetism	P Planetary Sciences	DI Study of the Earth's Deep Interior
⊙ Swift Session	B Biogeosciences	H Hydrology	PA Public Affairs	MR Mineral and Rock Physics
⊕ Cosponsored by AMS	C Cryosphere	IN Earth and Space Science Informatics	PP Paleoclimatology and Paleoclimatology	S Seismology
⊕ Cosponsored by EGU-GMPV	ED Education and Human Resources	NG Nonlinear Geophysics	SI Societal Impacts and Policy Sciences	T Tectonophysics
* Cosponsored by IAS	EP Earth and Planetary Surface Processes	NH Natural Hazards	SA SPA-Aeronomy	V Volcanology, Geochemistry, and Petrology
◇ Cosponsored by MSA				

	A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V
Monday P.M.																											
Seismology																											
S14A																											
Tectonophysics																											
T14A																											
T14B																											
T14C																											
Volcanology, Geochemistry, and Petrology																											
V14A																											
V14B																											
Tuesday A.M.																											
Union																											
U21A																											
Atmospheric Sciences																											
A21A																											
A21B																											
A21C																											
A21D																											
A21E																											
A21F																											

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		Union	Geodesy					Near Surface Geophysics	SPA-Solar and Heliospheric Physics																					
		Atmospheric Sciences	Global Environmental Change					Ocean Sciences	SPA-Magnetospheric Physics																					
		AE Atmospheric and Space Electricity	Geomagnetism and Paleomagnetism					Planetary Sciences	Study of the Earth's Deep Interior																					
		B Biogeosciences	H Hydrology					Public Affairs	MR Mineral and Rock Physics																					
		C Cryosphere	IN Earth and Space Science Informatics					PP Paleoclimatology and Paleodiatomatology	S Seismology																					
		ED Education and Human Resources	NG Nonlinear Geophysics					SI Societal Impacts and Policy Sciences	T Tectonophysics																					
		EP Earth and Planetary Surface Processes	NH Natural Hazards					SA SPA-Aeronomy	V Volcanology, Geochemistry, and Petrology																					
													GC	GC	G	G	PA	PP	SI	SH	SM	DI	MR	S	T	V				
													Moscione South: 303	Moscione South: 303																
Tuesday A.M.																														
D121C	Seismic Anisotropy, Predictions, Observations, and Interpretations II	8:00 A.M.	Moscione South: 303																											
	Mineral and Rock Physics																													
MR21A	Chemistry and Physics of Earth's Lower Mantle and Core III Posters	8:00 A.M.	Moscione South: Hall A-C																											
MR21B	Subsurface Science and Engineering of Shale II	8:00 A.M.	Moscione South: 301																											*
	Seismology																													
S21A	A Decade of EarthScope Advances in Research, Infrastructure, and Education I Posters	8:00 A.M.	Moscione South: Hall A-C																											
S21B	Advances in Nuclear Test Monitoring From Multiple Technologies I Posters	8:00 A.M.	Moscione South: Hall A-C																											
S21C	Understanding the Cascadia Subduction Zone: Contributions From the Cascadia Initiative and Multidisciplinary Studies III Posters	8:00 A.M.	Moscione South: Hall A-C																											
S21D	Seismology Contributions: Seismicity III	8:00 A.M.	Moscione South: 307																											
S21E	Advances in Seismic Imaging: Toward Integrated Geomodels on All Scales—Mantle I	8:00 A.M.	Moscione South: 305																											
	Tectonophysics																													
T21A	Continental Rifts and Rifted Margins V Posters	8:00 A.M.	Moscione South: Hall A-C																											
T21B	Continental Rifts and Rifted Margins VI Posters	8:00 A.M.	Moscione South: Hall A-C																											
T21C	Cratonic Lithosphere and Dynamics: What Can Present-Day Cratonic Structure Tell Us About Craton Formation and Evolution? I	8:00 A.M.	Moscione South: 306																											
T21D	Earthquake Recurrence Revisited: New Insights From Paleoseismic and Geomorphic Investigations I	8:00 A.M.	Moscione South: 308																											
T21E	New Views on Strike-Slip Fault Zones I	8:00 A.M.	Moscione South: 302																											
T21F	Oceanic Detachment Faulting and Associated Processes at Mid-Ocean Ridges I	8:00 A.M.	Moscione South: 310																											
T21G	Seismology, Active Tectonics, and Geomorphology in South and East Asia IV: Structure/Tectonics	8:00 A.M.	Moscione South: 304																											
	Volcanology, Geochemistry, and Petrology																													
V21A	Examining Soil Salts in Hyperarid Environments on Earth and Mars Posters	8:00 A.M.	Moscione South: Hall A-C																											

Tuesday A.M.		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	SR	T	V				
V21B	Investigating Volcanic Conduits and Related Processes Through Experiments, Numerical Modelling and Observations III Posters †	8:00 A.M.	Moscone South: Hall A-C																													
V21C	Tectonics and Magmatism in the Alaska-Aleutian, Cascadia, and Taupo-Ionga Subduction Systems III Posters †	8:00 A.M.	Moscone South: Hall A-C																													
V21D ◉	Volcanic Flows, Blows, and the Atmosphere: Effusive-Explosive Eruption Dynamics and Ash Cloud Processes I (Virtual Option) †	8:00 A.M.	Moscone South: 104																													
Union																																
U22A	IPCC Climate Change 2013: Assessment of the Future – Future of the Assessment (Virtual Option)	10:20 A.M.	Moscone South: 102																													
U22B	Your Science Can Make a Difference. Are You Up for It? - AGU's Thriving Earth Exchange	10:20 A.M.	Moscone West: 3020																													
Atmospheric Sciences																																
A22A	Bjerknes Lecture (Virtual Option)	10:20 A.M.	Moscone West: 2022																													
Atmospheric and Space Electricity																																
AE22A	Global Connections in Earth's Atmosphere-Electrical System I	10:20 A.M.	Moscone West: 3004																													
Biogeosciences																																
B22A	Carbon Cycle on Arid Lands in the Changing World: Biotic and Abiotic Processes I	10:20 A.M.	Moscone West: 2002																													
B22B	Deep Biosphere Research: Presence, Diversity, and Activity of Microbes II	10:20 A.M.	Moscone West: 2006																													
B22C	Dynamics of Global Forests Under a Changing Climate I	10:20 A.M.	Moscone West: 2000																													
B22D	Soil Change and Soil Organic Matter Dynamics in the Anthropocene I	10:20 A.M.	Moscone West: 2004																													
B22E	Dynamics of the Interaction Between Microbes and Environment Under Changes: Characterization, Adaptation, Control, and Selection I	10:20 A.M.	Moscone West: 3014																													
B22F	Windows Into the Deep Subsurface Biosphere: Coupled Geochemical and Biological Investigations of Terrestrial Hot Spring Ecosystems I	10:20 A.M.	Moscone West: 3011																													
B22G ◉	Biosphere-Atmosphere Exchange, Biosynthesis, and Oxidation of Volatile Organic Compounds Across Terrestrial and Marine Ecosystems I	10:20 A.M.	Moscone West: 3012																													
Cryosphere																																
C22A	Climate Change and Cryospheric Systems II	10:20 A.M.	Moscone West: 3005																													
Education																																
ED22A	Building Capacity for Hydrologic Science in Africa and Asia II	10:20 A.M.	Moscone West: 3018																													

Tuesday A.M.			A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V
OS22B	Regime Changes in Estuarine and Coastal Systems II	10:20 A.M.	Moscone West: 309																										
Planetary Sciences																													
P22A	Characterizing Small Solar System Bodies I	10:20 A.M.	Moscone West: 207																										
P22B	Using Topography to Investigate the Evolution of Solar System Bodies I	10:20 A.M.	Moscone West: 205																										
Public Affairs																													
PA22A	Improving Public Access to Science Research I	10:20 A.M.	Moscone West: 3016																										
Paleoceanography and Paleoclimatology																													
PP22A	Reconstructing Past Carbon Cycle Perturbations: Novel Developments and Applications II	10:20 A.M.	Moscone West: 208																										
SPA-Aeronomy																													
SA22A	Vertical Coupling and the Disturbance of the Winter Polar Atmosphere II	10:20 A.M.	Moscone West: 2011																										
SPA-Solar and Heliospheric Physics																													
SH22A	Exploring the Interstellar Medium Affected by the Heliosphere I	10:20 A.M.	Moscone West: 209																										
SPA-Magnetospheric Physics																													
SM22A	Aurora Dynamics and Applications II	10:20 A.M.	Moscone West: 2016																										
SM22B	Buildup and Dynamics of Ring Current and Radiation Belts at Earth I	10:20 A.M.	Moscone West: 2018																										
Study of Earth's Deep Interior																													
DI22A	Seismic Anisotropy: Predictions, Observations, and Interpretations III	10:20 A.M.	Moscone South: 303																										
Mineral and Rock Physics																													
MR22A	Mechanisms of Mineral Carbonation, Hydration, and Oxidation, With Potential Applications Including Carbon Capture and Storage I	10:20 A.M.	Moscone South: 301																										
Seismology																													
S22A	Seismology Contributions: Seismicity IV	10:20 A.M.	Moscone South: 307																										
S22B	Advances in Seismic Imaging: Toward Integrated Geophysical Models on All Scales—Theory II	10:20 A.M.	Moscone South: 305																										
Tectonophysics																													
T22A	Cratonic Lithosphere and Dynamics: What Can Present-Day Cratonic Structure Tell Us About Craton Formation and Evolution? II	10:20 A.M.	Moscone South: 306																										
T22B	Earthquake Recurrence Revisited: New Insights From Paleoseismic and Geomorphic Investigations II	10:20 A.M.	Moscone South: 308																										
T22C	Investigating Marine Records of Climate-Tectonic Interactions in Active Orogens: Southern Alaska and Other Convergent Margins I	10:20 A.M.	Moscone South: 310																										
T22D	New Views on Strike-Slip Fault Zones II	10:20 A.M.	Moscone South: 302																										

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Tuesday A.M.

		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SH	SM	DI	MR	S	T	V
T22E	Seismology, Active Tectonics, and Geomorphology in South and East Asia V: Structure/Tectonics						○																				
	10:20 A.M.																										
V22A	Bowen Lecture (Virtual Option)																										
	10:20 A.M.																										
A22B	Charney Lecture (Virtual Option)																										
	11:20 A.M.																										
Tuesday P.M.																											
U22C	Union Frontiers of Geophysics Lecture																										
	12:30 P.M.																										
U23A	Earth Science Instruments and Opportunities on the International Space Station (Virtual Option)																										
	1:40 P.M.																										
A23B	Atmospheric Composition and Chemistry Posters																										
	1:40 P.M.																										
A23C	Atmospheric Modeling of Extrasolar Planets Posters																										
	1:40 P.M.																										
A23D	Effects of Aerosol on Convective Clouds Posters																										
	1:40 P.M.																										
A23E	Quantifying Changing Global and Regional CH4 and N2O Budgets Using Measurements and Models: Top-Down and Bottom-Up Constraints I Posters																										
	1:40 P.M.																										
A23F	Aerosol, Tropical Cyclones, Volcanic Emissions, Measurements, Data, and SASKTRAN Posters																										
	1:40 P.M.																										
A23G	Weather, Dynamics, and Climate Posters																										
	1:40 P.M.																										
A23H	Air Quality and Climate in the Southeast U.S. III ▲																										
	1:40 P.M.																										
A23I	Greenhouse Gas Measurements Using Active Optical Remote Sensing II ▲																										
	1:40 P.M.																										
A23J	Quantifying Changing Global and Regional CH4 and N2O Budgets Using Measurements and Models: Top-Down and Bottom-Up Constraints II																										
	1:40 P.M.																										
A23K	Sources and Chemistry of Atmospheric Oxidants III																										
	1:40 P.M.																										

		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V	
Tuesday P.M.																													
PP23B	Reconstructing Past Carbon Cycle Perturbations: Novel Developments and Applications III Posters	1:40 P.M.								●						●													
PP23C	Water Isotope Systematics: Improving Our Palaeoclimate Interpretations III Posters	1:40 P.M.																											
PP23D	Climate Variability From Multiple Reconstructions I	1:40 P.M.						○																					
SPA-Aeronomy																													
SA23A	Vertical Coupling and the Disturbance of the Winter Polar Atmosphere III Posters	1:40 P.M.	●																										
SA23B	Active Experiments in Ionospheric Modification and Probing II	1:40 P.M.																				○							
SPA-Solar and Heliospheric Physics																													
SH23A	Coupling the Multiphysics of the Heliosphere From the Deep Interior to the Corona: Observations, Modeling, and Data Assimilation II Posters	1:40 P.M.																											
SH23B	First Results From the Interface Region Imaging Spectrograph (IRIS) II Posters	1:40 P.M.																											
SH23C	IBEX and the Evolving 3-D Heliosphere II Posters	1:40 P.M.																											
SH23D	Solar Events and Their Earth Connection During the Ascending Phase of Solar Cycle 24 I	1:40 P.M.																					★						
SPA-Magnetospheric Physics																													
SM23A	Aurora Dynamics and Applications III Posters	1:40 P.M.																			●								
SM23B	Bow Shock, Magnetosheath, and Magnetopause Processes I	1:40 P.M.															★												
SM23C	Buildup and Dynamics of Ring Current and Radiation Belts at Earth II	1:40 P.M.																											
Study of Earth's Deep Interior																													
DI23A	Probing the Earth's Interior I Posters	1:40 P.M.							●																				
DI23B	Geophysical Observations and Models of Subduction I	1:40 P.M.																											
Mineral and Rock Physics																													
MR23A	Computational Advances and Applications in Mineral Physics I Posters	1:40 P.M.																											
MR23B	Planetary Impacts and Interiors From Experiments and Theory III Posters	1:40 P.M.										●																	
MR23C	Advances in Rock Physics and Rock Mechanics—From Faults to Reservoirs II—Flow	1:40 P.M.																											
Seismology																													
S23A	Advances in Seismic Imaging: Toward Integrated Geomodels on All Scales—Shallow/Industry III Posters	1:40 P.M.									●																		
S23B	Infrasound and Seismoacoustics II Posters	1:40 P.M.																											
S23C	A Decade of EarthScope Advances in Research, Infrastructure, and Education II	1:40 P.M.																											
S23D	Advances in Nuclear Test Monitoring From Multiple Technologies II	1:40 P.M.																											

- Session Sponsors & Cosponsors**
- Oral Session
 - Poster Session
 - ⊙ Swift Session
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- U Union
- A Atmospheric Sciences
- AE Atmospheric and Space Electricity
- B Biogeosciences
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- ED Education and Human Resources
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- PA Planetary Sciences
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- SH SPA-Solar and Heliospheric Physics
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- DI Study of the Earth's Deep Interior
- MR Mineral and Rock Physics
- S Seismology
- T Tectonophysics
- V Volcanology, Geochemistry, and Petrology

Tuesday P.M.

			A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V		
S23E ⊙	Geophysical Monitoring for Geologic Carbon Storage I	1:40 P.M.																													
Tectonophysics																															
T23A	Cratonic Lithosphere and Dynamics: What Can Present-Day Cratonic Structure Tell Us About Craton Formation and Evolution? III Posters	1:40 P.M.																							●						
T23B	Cratonic Lithosphere and Dynamics: What Can Present-Day Cratonic Structure Tell Us About Craton Formation and Evolution? IV Posters	1:40 P.M.																							●						
T23C	Earthquake Recurrence Revisited: New Insights From Paleoseismic and Geomorphic Investigations III Posters	1:40 P.M.													●																
T23D	Investigating Marine Records of Climate-Tectonic Interactions in Active Orogens: Southern Alaska and Other Convergent Margins II Posters	1:40 P.M.					●																								
T23E	New Views on Strike-Slip Fault Zones III Posters	1:40 P.M.							●																						
T23F	Oceanic Detachment Faulting and Associated Processes at Mid-Ocean Ridges II Posters	1:40 P.M.																													
T23G	The First Step of the Wilson Cycle: Rifting to Post-Breakup Processes of Passive Continental Margins Posters	1:40 P.M.																													
T23H	Collision, Accretion, Slab-Windows, and Oroclines: The Evolution of Congested Subduction Zone I	1:40 P.M.																													
T23I	Seismology, Active Tectonics, and Geomorphology in South and East Asia VI: Seismogenesis	1:40 P.M.						○																							
T23J	The Microstructural Record of Aseismic to Seismic Fault Slip I	1:40 P.M.																													
Volcanology, Geochemistry, and Petrology																															
V23A	Volcanology, Geochemistry, and Petrology General Contributions III Posters	1:40 P.M.																													
V23B ⊙	Uncertainty in Natural Hazard Assessment: Volcanoes, Earthquakes, Wildfires, and Weather Phenomena Posters	1:40 P.M.																													
V23C ⊙	Volcanic Flows, Blows, and the Atmosphere: Effusive-Eruptive Eruption Dynamics and Ash Cloud Processes II Posters †	1:40 P.M.																													
V23D	Melting and Melt-Rock Reaction From Source to Surface †	1:40 P.M.																													
V23E	Exsolution, Degassing, and Regassing of Magmatic Volatiles I	1:40 P.M.																													
Natural Hazards																															
NH23B	White Lecture (Virtual Option)	2:40 P.M.																													

		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V	
Tuesday P.M.																													
SPA-Solar and Heliospheric Physics																													
SH24A	Solar Energetic Particles During the Weak Solar Cycle 24 I	Moscone West: 2009																											
		4:00 P.M.																											
SPA-Magnetospheric Physics																													
SM24A	Bow Shock, Magnetosheath, and Magnetopause Processes II	Moscone West: 2016																											
		4:00 P.M.																											
SM24B	Buildup and Dynamics of Ring Current and Radiation Belts at Earth III	Moscone West: 2018																											
		4:00 P.M.																											
Study of Earth's Deep Interior																													
DI24A	Geophysical Observations and Models of Subduction II	Moscone South: 303																											
		4:00 P.M.																											
Mineral and Rock Physics																													
MR24A	Advances in Rock Physics and Rock Mechanics: From Faults to Reservoirs III: Reservoirs	Moscone South: 301																											
		4:00 P.M.																											
MR24B	Constraints and Uncertainties on the Composition, Structure, and Dynamics of the Earth's Lithosphere, Upper Mantle, and Transition Zone From Multidisciplinary Studies I	Moscone West: 2005																											
		4:00 P.M.																											
Seismology																													
S24A	A Decade of EarthScope Advances in Research, Infrastructure, and Education III	Moscone South: 305																											
		4:00 P.M.																											
S24B	Advances in Nuclear Test Monitoring From Multiple Technologies III	Moscone South: 307																											
		4:00 P.M.																											
Tectonophysics																													
T24A	Collision, Accretion, Slab-Windows, and Oroclines: The Evolution of Congested Subduction Zone II	Moscone South: 306																											
		4:00 P.M.																											
T24B	Neotectonics and Earthquake Potential of the Eastern Mediterranean Region I	Moscone South: 302																											
		4:00 P.M.																											
T24C	Seismology, Active Tectonics, and Geomorphology in South and East Asia VII: Geomorphology	Moscone South: 304																											
		4:00 P.M.																											
Volcanology, Geochemistry, and Petrology																													
V24A	Melting and Melt-Rock Reaction From Source to Surface II +	Moscone South: 310																											
		4:00 P.M.																											
V24B	The Early Earth I (Virtual Option)	Moscone South: 103																											
		4:00 P.M.																											
V24C	Exsolution, Degassing, and Releasing of Magmatic Volatiles II	Moscone South: 308																											
		4:00 P.M.																											
Geodesy																													
G24A	Bowie Lecture (Virtual Option)	Moscone South: 104																											
		5:00 P.M.																											
Wednesday A.M.																													
Atmospheric Sciences																													
A31A	Fast Physics in Climate Models and Cloud-Resolving Models: Parameterization, Evaluation, and Observation Posters	Moscone South: Hall A-C																											
		8:00 A.M.																											

Wednesday A.M.		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V	
Mineral and Rock Physics																													
MR31A	Advanced Techniques for Experimental Geophysics and Mineralogy I Posters	8:00 A.M.	Moscone South: Hall A-C																										
MR31B	Constraints and Uncertainties on the Composition, Structure, and Dynamics of the Earth's Lithosphere, Upper Mantle, and Transition Zone From Multidisciplinary Studies II	8:00 A.M.	Moscone West: 2007																										
Seismology																													
S31A	Constraints on Lithosphere-Asthenosphere Coupling Using Seismic and Geodetic Techniques Posters	8:00 A.M.	Moscone South: Hall A-C																										
S31B	Nonseismology Seismology: Diverse Non-Earth Applications of Seismological Techniques Posters	8:00 A.M.	Moscone South: Hall A-C																										
S31C	Seismology Contributions: Constraining Crustal Structure I Posters	8:00 A.M.	Moscone South: Hall A-C																										
S31D	Advances in Seismic Imaging: Toward Integrated Geomodels on All Scales—Global IV	8:00 A.M.	Moscone South: 305																										
S31E	Characterization and Modeling for Nuclear Test Monitoring and Verification I	8:00 A.M.	Moscone South: 307																										
S31F	Microscale- and Macroscale-Induced Seismicity: Observations and Mechanics I	8:00 A.M.	Moscone South: 304																										
Tectonophysics																													
T31A	Evolution of the Northern Tibetan Plateau: Lithospheric Geodynamics, Plateau Uplift, and Links to Climate Change I Posters	8:00 A.M.	Moscone South: Hall A-C																										
T31B	Evolution of the Northern Tibetan Plateau: Lithospheric Geodynamics, Plateau Uplift, and Links to Climate Change II Posters	8:00 A.M.	Moscone South: Hall A-C																										
T31C	Geodynamic Modeling of Lithosphere Deformation: Advances and Challenges I Posters	8:00 A.M.	Moscone South: Hall A-C																										
T31D	Innovative Approaches to Constraining Lithospheric Deformation in Space and Time I Posters	8:00 A.M.	Moscone South: Hall A-C																										
T31E	Neotectonics and Earthquake Potential of the Eastern Mediterranean Region II Posters	8:00 A.M.	Moscone South: Hall A-C																										
T31F	Recent IODP Investigations of Circum-Pacific Subduction Zones I Posters	8:00 A.M.	Moscone South: Hall A-C																										
T31G	Recent IODP Investigations of Circum-Pacific Subduction Zones II Posters	8:00 A.M.	Moscone South: Hall A-C																										
Volcanology, Geochemistry, and Petrology																													
V31A	Melting and Melt-Rock Reaction From Source to Surface III Posters †	8:00 A.M.	Moscone South: Hall A-C																										
V31B	Exsolution, Degassing, and Regassing of Magmatic Volatiles III Posters	8:00 A.M.	Moscone South: Hall A-C																										
V31C	From Magmas to Ore Deposits: Tracking the Transition I	8:00 A.M.	Moscone South: 310																										
V31D	Geochemistry of Geologic Carbon Sequestration: Mineral-H ₂ O-CO ₂ Geochemistry and Other Topics I †	8:00 A.M.	Moscone West: 3005																										
V31E	The Early Earth II	8:00 A.M.	Moscone South: 306																										
V31F	Permian-Triassic Environmental and Climatic Extremes and Biotic Responses I	8:00 A.M.	Moscone South: 302																										

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Wednesday A.M.																													
V31G	Volcanic Flows, Blows, and the Atmosphere: Effusive-Explosive Eruption Dynamics and Ash Cloud Processes III †														○														
Union																													
U32A	Water, Energy, and Food Security in a Changing World: Finding Solutions Through Integration of Physical and Social Sciences																												
Atmospheric Sciences																													
A32A	Fingerprinting Sources and Transformation of Sulfate Aerosol Using Sulfur and Oxygen Isotopes ▲																												
A32B	New Atmospheric Sciences Fellows Presentations (Virtual Option)																												
A32C	The Southern Ocean: Clouds, Aerosols, and the Air-Sea Interface I																												
A32D	Understanding Emissions of Air Pollutants and Greenhouse Gases in China I																												
A32E	Advances in Atmospheric Inverse Modeling of Land-Air-mosphere Exchange Processes I ▲																												
Atmospheric and Space Electricity																													
AE32A	Lightning Effects on the Near-Earth Space Environment and Lightning Production of NOx II																												
Biogeosciences																													
B32A	Carbon Cycling in Coastal Wetlands: From Microscale to Macroscale I																												
B32B	Land Use and Climate Change Impacts on Water-Related Ecosystem Services I																												
B32C	Linking Geochemical and Microbial Effects on Organic Matter Dynamics in Cold Ecosystems I																												
B32D	Novel Approaches for Considering Future Vegetation Distributions I																												
Cryosphere																													
C32A	Climate Change and Cryospheric Systems IV																												
Education																													
ED32A	Climate Literacy: Impacts, Evidence, and Best Practices From Research and Evaluation I (Virtual Option)																												
Earth and Planetary Surface Processes																													
EP32A	Biophysical Interactions in Rivers: Restoration and Management II																												

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- EP Earth and Planetary Surface Processes

- G Geodesy
- GC Global Environmental Change
- GP Geomagnetism and Paleomagnetism
- H Hydrology
- IN Earth and Space Science Informatics
- NG Nonlinear Geophysics
- NH Natural Hazards

- NS Near Surface Geophysics
- OS Ocean Sciences
- P Planetary Sciences
- PA Public Affairs
- PP Paleoclimatology and Paleoclimatology
- SI Societal Impacts and Policy Sciences
- SA SPA-Aeronomy

- SH SPA-Solar and Heliospheric Physics
- SM SPA-Magnetospheric Physics
- DI Study of the Earth's Deep Interior
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- V Volcanology, Geochemistry, and Petrology

Wednesday A.M.

			A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SM	SH	DI	MR	S	T	V
Planetary Sciences																												
P32A ⊙	Dynamic Processes in Mars's Atmosphere I	10:20 A.M.																										
P32B ⊙	Solar System Dusty Plasma I	10:20 A.M.																										
Paleoclimatology and Paleoclimatology																												
PP32A	Emiliani Lecture (Virtual Option)	10:20 A.M.																										
SPA-Aeronomy																												
SA32A	Aeronomy Near the Turbopause From Solar Min to Solar Max I	10:20 A.M.																										
SPA-Solar and Heliospheric Physics																												
SH32A	Coronal Heating and Solar Wind Acceleration: Theory, Observations, and Simulations II	10:20 A.M.																										
SH32B	Seed Populations, Acceleration, and Transport of Solar Energetic Particles From the Low Corona II	10:20 A.M.																										
SPA-Magnetospheric Physics																												
SM32A	Integrating Theories and Observations of the Earth's Inner Magnetosphere II	10:20 A.M.																										
Study of Earth's Deep Interior																												
DI32A	Multidisciplinary Constraints on the Nature and Scale of Mantle Heterogeneities I	10:20 A.M.																										
Mineral and Rock Physics																												
MR32A	Fluids and Melts in the Earth's Interior: From Crust to Core-Mantle Boundaries I	10:20 A.M.																										
Seismology																												
S32A	Seismology Contributions: Megathrusts I	10:20 A.M.																										
S32B ⊙	Advances in Seismic Imaging: Toward Integrated Geophysical Models on All Scales—Shallow V	10:20 A.M.																										
S32C	Microscale- and Macroscale- Induced Seismicity: Observations and Mechanics II	10:20 A.M.																										
Volcanology, Geochemistry, and Petrology																												
V32A	Chemical Evolution of the Earth's Mantle I ◇	10:20 A.M.																										
V32B	Geology, Geophysics, and Flow Modeling of Hydrothermal Alteration in Geothermal and Volcanic Systems I	10:20 A.M.																										
V32C	Permian-Triassic Environmental and Climatic Extremes and Biotic Responses II	10:20 A.M.																										

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- A Atmospheric Sciences
 - AE Atmospheric and Space Electricity
 - B Biogeosciences
 - C Cryosphere
 - ED Education and Human Resources
 - EP Earth and Planetary Surface Processes

- G Geodesy**
- GC Global Environmental Change
 - GP Geomagnetism and Paleomagnetism
 - H Hydrology
 - IN Earth and Space Science Informatics
 - NG Nonlinear Geophysics
 - NH Natural Hazards

- NS Near Surface Geophysics**
- OS Ocean Sciences
 - P Planetary Sciences
 - PA Public Affairs
 - PP Paleoclimatology and Paleolimatology
 - SI Societal Impacts and Policy Sciences
 - SA SPA-Aeronomy

- SH SPA-Solar and Heliospheric Physics**
- SM SPA-Magnetospheric Physics
 - DI Study of the Earth's Deep Interior
 - MR Mineral and Rock Physics
 - S Seismology
 - T Tectonophysics
 - V Volcanology, Geochemistry, and Petrology

Wednesday P.M.

			A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SH	SM	DI	MR	S	T	V
SM33B	Snapshot of Earth From Juno and Earth-Based Assets II Posters	1:40 P.M.																										
SM33C	Integrating Theories and Observations of the Earth's Inner Magnetosphere III	1:40 P.M.																										
Study of Earth's Deep Interior																												
DI33A	Geophysical Observations and Models of Subduction III Posters	1:40 P.M.																										
DI33B	The Detection and Migration of Melt and Volatiles in the Earth's Interior II Posters	1:40 P.M.																										
DI33C	Probing the Earth's Interior II	1:40 P.M.																										
Mineral and Rock Physics																												
MR33A	Fluids and Melts in the Earth's Interior: From Crust to Core-Mantle Boundaries II Posters	1:40 P.M.																										
MR33B	Mechanisms of Mineral Carbonation, Hydration, and Oxidation, With Potential Applications Including Carbon Capture and Storage II Posters	1:40 P.M.																										
MR33C	Plastic and Transport Properties of Deep Earth Materials I	1:40 P.M.																										
Seismology																												
S33A	Advances in Seismic Imaging: Toward Integrated Geophysical Models on All Scales—Mantle/Global/Theory VI Posters	1:40 P.M.																										
S33B	Characterization and Modeling for Nuclear Test Monitoring and Verification II Posters	1:40 P.M.																										
S33C	Geophysical Monitoring for Geologic Carbon Storage II Posters	1:40 P.M.																										
S33D	Microscale- and Macroscale-Induced Seismicity: Observations and Mechanics III Posters	1:40 P.M.																										
S33E	Seismology Contributions: Mega-earthquakes II	1:40 P.M.																										
S33F	Seismology Contributions: Constraining Crustal Structure II	1:40 P.M.																										
Tectonophysics																												
T33A	Collision, Accretion, Slab-Windows, and Oroclines: The Evolution of Congested Subduction Zone III Posters	1:40 P.M.																										
T33B	Collision, Accretion, Slab-Windows, and Oroclines: The Evolution of Congested Subduction Zone IV Posters	1:40 P.M.																										
T33C	The Microstructural Record of Aseismic to Seismic Fault Slip II Posters	1:40 P.M.																										
T33D	Evolution of the Northern Tibetan Plateau: Lithospheric Geodynamics, Plateau Uplift, and Links to Climate Change III	1:40 P.M.																										

Wednesday P.M.				A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V	
T33E	Geodynamic Modeling of Lithosphere Deformation: Advances and Challenges II	1:40 P.M.	Moscote South: 302																												
T33F	Recent IODP Investigations of Circum-Pacific Subduction Zones III	1:40 P.M.	Moscote South: 304																												
Volcanology, Geochemistry, and Petrology																															
V33A	Chemical Evolution of the Earth's Mantle II Posters † ⇄	1:40 P.M.	Moscote South: Hall A-C																												
V33B	From Magmas to Ore Deposits: Tracking the Transition II Posters	1:40 P.M.	Moscote South: Hall A-C																												
V33C	Geology, Geophysics, and Flow Modeling of Hydrothermal Alteration in Geothermal and Volcanic Systems II Posters	1:40 P.M.	Moscote South: Hall A-C																												
V33D	The Early Earth III Posters	1:40 P.M.	Moscote South: Hall A-C																												
V33E	Permian-Triassic Environmental and Climatic Extremes and Biotic Responses III Posters	1:40 P.M.	Moscote South: Hall A-C																												
V33F	Magma Plumbing, Transport, and Eruption at Basaltic Volcanoes I † ⇄	1:40 P.M.	Moscote South: 310																												
V33G	Mineralization Processes in Biological and Inorganic Environments I (Virtual Option) ⇄	1:40 P.M.	Moscote West: 3002																												
V33H	Physical Volcanology of Eruptions Involving Water I	1:40 P.M.	Moscote South: 308																												
Planetary Sciences																															
P33B	Whipple Lecture (Virtual Option)	2:40 P.M.	Moscote West: 2022																												
Union																															
U34A	Understanding and Monitoring Abrupt Climate Change and Its Impacts (Virtual Option)	4:00 P.M.	Moscote South: 102																												
Atmospheric Sciences																															
A34A	Measurements, Modeling, and Evaluation of Emissions II	4:00 P.M.	Moscote West: 3008																												
A34B	Molecular Chemistry and Physicochemical Properties of Organic Aerosols III	4:00 P.M.	Moscote West: 3010																												
A34C	The Madden-Julian Oscillation: Its Initiation, Identification, and Structure III ⇄	4:00 P.M.	Moscote West: 3012																												
A34D	Advances in Subgrid-Scale Turbulence and Cloud Parameterizations for Cloud-Resolving Models II ⇄	4:00 P.M.	Moscote West: 3006																												
A34E	Innovative Topics in Atmospheric Science II	4:00 P.M.	Moscote West: 3004																												
Biogeosciences																															
B34A	Low- and No-Altitude Remote Sensing: Innovative Systems and Applications I	4:00 P.M.	Moscote West: 2006																												
B34B	Understanding Uncertainty in Remotely Sensed Vegetation Data Products I	4:00 P.M.	Moscote West: 2004																												
B34C	Urban Areas and Global Change III	4:00 P.M.	Moscote West: 2002																												
Cryosphere																															
C34A	Improved Glacier Mass Balance Assessment and Projection: Methods and Modeling II	4:00 P.M.	Moscote West: 3005																												

Wednesday P.M.		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V
Earth and Space Science Informatics																												
IN34A	Search, Discovery, and Visual Representation of Scientific Data II	4:00 P.M.	Moscone West: 2020																									
Nonlinear Geophysics																												
NG34A	Lorenz Lecture (Virtual Option)	4:00 P.M.	Moscone South: 104																									
Natural Hazards																												
NH34A	Interdisciplinary Approaches to Natural Hazards: Environmental, Economical, and Societal Significance II	4:00 P.M.	Moscone South: 309																									
Near Surface Geophysics																												
NS34A	Advances in Exploration Geophysics II	4:00 P.M.	Moscone West: 2000																									
Ocean Sciences																												
OS34A	Thirty Years of ENSO Research: Dynamics, Predictability, Modeling, Impacts III	4:00 P.M.	Moscone West: 3007																									
Planetary Sciences																												
P34A	High Priority Investigations for Venus Exploration I	4:00 P.M.	Moscone West: 2009																									
P34B	Icy Bodies: From Laboratory to Space Missions I	4:00 P.M.	Moscone West: 2011																									
P34C	Impact Cratering: Terrestrial Observations and Planetary Applications I	4:00 P.M.	Moscone West: 2016																									
Paleoceanography and Paleoclimatology																												
PP34A	Miocene Climate I	4:00 P.M.	Moscone West: 2010																									
PP34B	Molecular Paleoclimatology: What Biomarkers Tell Us About the Earth's Climate System II	4:00 P.M.	Moscone West: 2008																									
SPA-Solar and Heliospheric Physics																												
SH34A	Parker Lecture (Virtual Option)	4:00 P.M.	Moscone West: 2022																									
SPA-Magnetospheric Physics																												
SM34A	Probing Magnetospheric Dynamics With Multipoint Measurements and Simulations IV	4:00 P.M.	Moscone West: 2018																									
Study of Earth's Deep Interior																												
DI34A	Probing the Earth's Interior III	4:00 P.M.	Moscone South: 303																									
DI34B	State of the Art in Computational Geoscience II	4:00 P.M.	Moscone South: 305																									
Mineral and Rock Physics																												
MR34A	Plastic and Transport Properties of Deep Earth Materials II	4:00 P.M.	Moscone South: 301																									
Seismology																												
S34A	Gutenberg Lecture (Virtual Option)	4:00 P.M.	Moscone South: 103																									

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U	Union	G	Geodesy	NS	Near Surface Geophysics	SH	SPA-Solar and Heliospheric Physics
A	Atmospheric Sciences	GC	Global Environmental Change	OS	Ocean Sciences	SM	SPA-Magnetospheric Physics
AE	Atmospheric and Space Electricity	GP	Geomagnetism and Paleomagnetism	P	Planetary Sciences	DI	Study of the Earth's Deep Interior
B	Biogeosciences	H	Hydrology	PA	Public Affairs	MR	Mineral and Rock Physics
C	Cryosphere	IN	Earth and Space Science Informatics	PP	Paleoceanography and Paleoclimatology	S	Seismology
ED	Education and Human Resources	NG	Nonlinear Geophysics	SI	Societal Impacts and Policy Sciences	T	Tectonophysics
EP	Earth and Planetary Surface Processes	NH	Natural Hazards	SA	SPA-Aeronomy	V	Volcanology, Geochemistry, and Petrology

Wednesday P.M.

		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V
Tectonophysics																												
T34A	Evolution of the Northern Tibetan Plateau: Lithospheric Geodynamics, Plateau Uplift, and Links to Climate Change IV					4:00 P.M.																						
T34B	Innovative Approaches to Constraining Lithospheric Deformation in Space and Time II					4:00 P.M.																						○
T34C	Recent IODP Investigations of Circum-Pacific Subduction Zones IV					4:00 P.M.																						
Volcanology, Geochemistry, and Petrology																												
V34A	Geochemistry of Geologic Carbon Sequestration: Upscaling and Natural Analogues II (Virtual Option) † ◆					4:00 P.M.																						
V34B	Magma Plumbing, Transport, and Eruption at Basaltic Volcanoes II † ◆					4:00 P.M.																						
V34C	Physical Volcanology of Eruptions Involving Water II					4:00 P.M.																						
Global Environmental Change																												
GC34B	GEC Special Lecture: Abrupt Climate Change in the Arctic (and Beyond): An Update (Virtual Option)					5:00 P.M.																						
SPA-Aeronomy																												
SA34A	Nicolet Lecture (Virtual Option)					5:00 P.M.																						

Thursday A.M.

		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V
Union																												
U41A	Big Data in the Earth and Space Sciences: The Real Challenges Are Accessibility and Usability (Virtual Option)					8:00 A.M.																						
Atmospheric Sciences																												
A41A	Boundary Layer Clouds and the MAGIC Campaign Posters					8:00 A.M.																						
A41B	Chemistry, Physics, and Dynamics Associated With Deep Convection and its Effect on UTLS Transport II Posters▲					8:00 A.M.																						
A41C	Cloud Properties: Observations and Their Uncertainties I Posters▲					8:00 A.M.																						
A41D	Constraining Aerosol Indirect Forcing in Climate Models With Observations I Posters▲					8:00 A.M.																						
A41E	Fog: Atmosphere, Biosphere, Land, and Ocean Interactions I Posters					8:00 A.M.																						

Session Sponsors & Cosponsors		U Union	G Geodesy	NS Near Surface Geophysics	SH SPA-Solar and Heliospheric Physics
○ Oral Session	A Atmospheric Sciences	AU Atmospheric and Space Electricity	GC Global Environmental Change	OS Ocean Sciences	SM SPA-Magnetospheric Physics
● Poster Session	AE Atmospheric and Space Electricity	B Biogeosciences	GP Geomagnetism and Paleomagnetism	P Planetary Sciences	DI Study of the Earth's Deep Interior
⊙ Swift Session	B Biogeosciences	C Cryosphere	H Hydrology	PA Public Affairs	MR Mineral and Rock Physics
▲ Sponsored by AMS	C Cryosphere	ED Education and Human Resources	I Earth and Space Sciences/Informatics	PP Paleoclimatology and Paleoclimatology	S Seismology
✦ Sponsored by EGU-GMPV	ED Education and Human Resources	EP Earth and Planetary Surface Processes	NG Nonlinear Geophysics	SI Societal Impacts and Policy Sciences	T Tectonophysics
* Sponsored by IAS	EP Earth and Planetary Surface Processes		NH Natural Hazards	SA SPA-Aeronomy	V Volcanology, Geochemistry, and Petrology
◇ Sponsored by MSA					

Thursday A.M.

Study of Earth's Deep Interior

			A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V
DI41A	Multidisciplinary Constraints on the Nature and Scale of Mantle Heterogeneities II Posters	8:00 A.M.																											
DI41B	New Constraints on the Structure and Dynamics of the Lower Mantle I	8:00 A.M.																											

Mineral and Rock Physics

MR41A	Plastic and Transport Properties of Deep Earth Materials III Posters	8:00 A.M.	●																											
MR41B	Advances in Rock Physics and Rock Mechanics: From Faults to Reservoirs IV: Fracture	8:00 A.M.																												

Seismology

S41A	Advances and Challenges for Earthquake Early Warning Systems I Posters	8:00 A.M.																												
S41B	Interplay of Slow Slip, Tremor, and Earthquakes I Posters	8:00 A.M.							●																					
S41C	Seismology Contributions: Mega-earthquakes III	8:00 A.M.							○																					
S41D	Advances in Seismic Imaging: Toward Integrated Geophysical Models on All Scales—Industry VII	8:00 A.M.																												

Tectonophysics

T41A	Integrated Studies of Slow Earthquakes I Posters	8:00 A.M.																												
T41B	Linking Earth Surface Dynamics and Deep Tectonic Processes I Posters	8:00 A.M.																												
T41C	Reconstruction of East Asian Blocks in Pangea Posters	8:00 A.M.																												
T41D	Controls on Fault Rupture Patterns I	8:00 A.M.																												
T41E	New Frontiers in Asia-Pacific Earth Sciences I	8:00 A.M.																												
T41F	Recent IODIP Investigations of Circum-Pacific Subduction Zones V	8:00 A.M.																												
T41G	The Geodynamics of Plate Tectonics I	8:00 A.M.																												

Volcanology, Geochemistry, and Petrology

V41A	Geochemistry of Geologic Carbon Sequestration III Posters †-◇	8:00 A.M.																												
V41B	Magma Plumbing, Transport, and Eruption at Basaltic Volcanoes III Posters †-◇	8:00 A.M.																												
V41C	Mineralization Processes in Biological and Inorganic Environments II Posters †-◇	8:00 A.M.																												
V41D	Physical Volcanology of Eruptions Involving Water III Posters	8:00 A.M.																												

Thursday A.M.				A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	ST	V
V41E	Earth System Oxygenation: An Inside Job? † ⇨	8:00 A.M.	Moscone South: 302			○																				○	○		
Planetary Sciences																													
P41B	Sagan Lecture (Virtual Option)	9:00 A.M.	Moscone West: 2022			○																							
Union																													
U42A	Hydro-meteorological Research at the Computational Frontier: Data-Intensive Prediction and Social Impact Assessment of Natural Disasters (Virtual Option)	10:20 A.M.	Moscone South: 102										○																
Atmospheric Sciences																													
A42A	Extratropical and High-Latitude Storms, Teleconnections, and the Changing Arctic Climate II	10:20 A.M.	Moscone West: 3012				○																						
A42B	Measurements, Modeling, and Evaluation of Emissions IV	10:20 A.M.	Moscone West: 3008			○																							
A42C	Ozone-Climate Connections II ⇨	10:20 A.M.	Moscone West: 3006			○								○															
A42D	Regional Climate Modeling III	10:20 A.M.	Moscone West: 3004			○																							
A42E	Satellite Measurements for Climate Model Evaluation, Diagnosis, and Improvements II	10:20 A.M.	Moscone West: 3010																										
Biogeosciences																													
B42A	New Developments in Geochemistry to Examine Environmental Impacts of Oil Sands Mining I	10:20 A.M.	Moscone West: 2003			○																							
B42B	Ecological Disturbance: Observing and Predicting the Impacts of Landscape Disturbance III	10:20 A.M.	Moscone West: 2006			○																							
B42C	Ecosystem Structure: Remote Sensing Observations and Modelling of Its Influence on Radiation Regimes and Gas Exchanges I	10:20 A.M.	Moscone West: 2004																										
B42D	The Bio-atmospheric N Cycle: N Emissions, Transformations, Deposition, and Terrestrial and Aquatic Ecosystem Impacts II	10:20 A.M.	Moscone West: 2002			○																							
Cryosphere																													
C42A	Glacier Monitoring From In Situ and Remotely Sensed Observations III	10:20 A.M.	Moscone West: 3005							○																			
C42B	Innovative Methods and Applications for Quantifying Glacier Processes I	10:20 A.M.	Moscone West: 3007																										
Earth and Planetary Surface Processes																													
EP42A	Sharp Lecture (Virtual Option)	10:20 A.M.	Moscone West: 2022																										
Geodesy																													
G42A	Inference of Glacial Dynamics and Earth Rheology From Geodetic and Geophysical Observations (GIA) I	10:20 A.M.	Moscone West: 3024																										
Global Environmental Change																													
GC42A	Future Land Use Change and Climate II	10:20 A.M.	Moscone West: 3001			○																							
GC42B	How Reliable and Accurate Are CMIP5 Climate Simulations? I	10:20 A.M.	Moscone West: 3003			○																							
GC42C	Ex Situ Carbon Mineralization II (Virtual Option)	10:20 A.M.	Moscone West: 3002			○																							

Thursday A.M.		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V
PA42B	Scientists Must Film! Using Video to Enhance and Expand Science and Science Communication II (Virtual Option)	10:20 A.M.	Moscone South: 104								○									○								
Paleoceanography and Paleoclimatology																												
PP42A	Climate of the Common Era II	10:20 A.M.	Moscone West: 2008																									
PP42B	Paleoclimatic History of the Pacific Sector of the Arctic II	10:20 A.M.	Moscone West: 2005																									
PP42C	Water Isotope Systematics: Improving Our Paleoclimate Interpretations II	10:20 A.M.	Moscone West: 2010																									
SPA-Aeronomy																												
SA42A	New Missions in the Thermosphere-Ionosphere II	10:20 A.M.	Moscone West: 2011																			○	○					
SPA-Solar and Heliospheric Physics																												
SH42A	Solar and Heliospheric Physics General Contributions V: Coronal Mass Ejections and Coronal Alfvén Waves	10:20 A.M.	Moscone West: 2016																									
SPA-Magnetospheric Physics																												
SM42A	Plasma Access to the Inner Magnetosphere I	10:20 A.M.	Moscone West: 2018																									
Study of Earth's Deep Interior																												
DI42A	New Constraints on the Structure and Dynamics of the Lower Mantle II	10:20 A.M.	Moscone South: 303																						○	○	○	○
Mineral and Rock Physics																												
MR42A	Advances in Rock Physics and Rock Mechanics: From Faults to Reservoirs V: Friction	10:20 A.M.	Moscone South: 301																						○	○	○	○
Seismology																												
S42A	Seismology Contributions: Signal Processing, Networks, and Instrumentation I	10:20 A.M.	Moscone South: 302								○																	
S42B	Earthquake Triggering and Interaction I	10:20 A.M.	Moscone South: 307																									
S42C	Advances in Seismic Imaging: Toward Integrated Geomodels on All Scales — Data/Arrays VIII	10:20 A.M.	Moscone South: 305																									
Tectonophysics																												
T42A	Controls on Fault Rupture Patterns II	10:20 A.M.	Moscone South: 308											○														
T42B	Origin, Evolution, and Impacts of High Topography in Continental Interiors I	10:20 A.M.	Moscone South: 306																							○	○	○
T42C	The Development, Advancement, and Application of Integrated Thermochronology in Earth Science I	10:20 A.M.	Moscone South: 310							○																		
T42D	The Geodynamics of Plate Tectonics II	10:20 A.M.	Moscone South: 304																							○	○	○
Volcanology, Geochemistry, and Petrology																												
V42A	Daly Lecture (Virtual Option)	11:20 A.M.	Moscone South: 103																									

		Thursday P.M.													V													
		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH		NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T
Mineral and Rock Physics																												
MR43A	Constraints and Uncertainties on the Composition, Structure, and Dynamics of the Earth's Lithosphere, Upper Mantle, and Transition Zone From Multidisciplinary Studies III Posters	1:40 P.M.																										
MR43B	Computational Advances and Applications in Mineral Physics II	1:40 P.M.																										
Seismology																												
S43A	Seismology Contributions: Mega-earthquakes IV Posters	1:40 P.M.																										
S43B	Mining Signals From Noise With Cross-Correlation Techniques I Posters	1:40 P.M.																										
S43C	Advances and Challenges for Earthquake Early Warning Systems II	1:40 P.M.																										
S43D	Earthquake Triggering and Interaction II	1:40 P.M.																										
Tectonophysics																												
T43A	Controls on Fault Rupture Patterns III Posters	1:40 P.M.																										
T43B	Origin, Evolution, and Impacts of High Topography in Continental Interiors II Posters	1:40 P.M.																										
T43C	Subduction Plate Boundaries From the Trench to Subarc and Beyond I Posters	1:40 P.M.																										
T43D	Subduction Plate Boundaries From the Trench to Subarc and Beyond II Posters	1:40 P.M.																										
T43E	Subduction Plate Boundaries From the Trench to Subarc and Beyond III Posters	1:40 P.M.																										
T43F	The Development, Advancement, and Application of Integrated Thermochronology in Earth Science II Posters	1:40 P.M.																										
T43G	Deformation Processes: Microstructure, Rheology, and the Effects of Fluids I	1:40 P.M.																										
T43H	Linking Earth Surface Dynamics and Deep Tectonic Processes II	1:40 P.M.																										
T43I	The Geodynamics of Plate Tectonics III	1:40 P.M.																										
Volcanology, Geochemistry, and Petrology																												
V43A	Earth System Oxygenation: An Inside Job? II Posters →	1:40 P.M.																										
V43B	Assessing Volcanic Processes Through Novel Monitoring Approaches I Posters →	1:40 P.M.																										
V43C	Volcanic Flow and Magma Properties: Field, Laboratory, and Hazard Assessment I →	1:40 P.M.																										
V43D	Stress, Strain, and Mass Changes at Volcanoes: Using Geodesy and Seismology to Interpret Volcanic Unrest I →	1:40 P.M.																										
Global Environmental Change																												
GC43B	The Tyndall History of Global Warming Lecture: Early Agriculture: Land Clearance and Climate Effects (Virtual Option)	2:40 P.M.																										

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- Oral Session
 - Poster Session
 - Swirl Session
 - Co-sponsored by AMS
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 - Co-sponsored by JAS
 - Co-sponsored by MSA

- U Union
- A Atmospheric Sciences
- AE Atmospheric and Space Electricity
- B Biogeosciences
- C Cryosphere
- ED Education and Human Resources
- EP Earth and Planetary Surface Processes
- G Geodesy
- GC Global Environmental Change
- GP Geomagnetism and Paleomagnetism
- H Hydrology
- IN Earth and Space Science Informatics
- NG Nonlinear Geophysics
- NH Natural Hazards
- OS Ocean Sciences
- P Planetary Sciences
- PA Public Affairs
- PP Paleoclimatology and Paleoclimatology
- SI Societal Impacts and Policy Sciences
- SA SPA-Aeronomy
- SH SPA-Solar and Heliospheric Physics
- SM SPA-Magnetospheric Physics
- DI Study of the Earth's Deep Interior
- MR Mineral and Rock Physics
- S Seismology
- T Tectonophysics
- V Volcanology, Geochemistry, and Petrology

		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V							
Thursday P.M.																																			
Paleoceanographic Records of Oxygen Change: Emerging Geochemical Proxies and Integration of Data Sets and Models II			Moscone West: 2008						<input checked="" type="radio"/>							<input checked="" type="radio"/>																			
PP44B			4:00 P.M.																																
SPA-Aeronomy																																			
SA44A	Low-Altitude Ion Outflow: Drivers and Consequences II		Moscone West: 2011																				<input checked="" type="radio"/>												
SPA-Solar and Heliospheric Physics																							<input checked="" type="radio"/>												
SH44A	Scientific Aspects of Space Weather Forecasting II		4:00 P.M.																					<input checked="" type="radio"/>											
SPA-Magnetospheric Physics																									<input checked="" type="radio"/>										
SM44A	Dawn-Dusk Asymmetries in Solar Wind-Magnetosphere-Ionosphere Systems I		4:00 P.M.														<input checked="" type="radio"/>																		
Mineral and Rock Physics																																			
MR44A	Advanced Techniques for Experimental Geophysics and Mineralogy II: Amorphous Materials, Melts, and Melting		4:00 P.M.																						<input checked="" type="radio"/>										
Seismology																																			
S44A	Advances and Challenges for Earthquake Early Warning Systems III		4:00 P.M.																			<input checked="" type="radio"/>													
S44B	Earthquake Triggering and Interaction III		4:00 P.M.																							<input checked="" type="radio"/>									
Tectonophysics																																			
T44A	Deformation Processes: Microstructure, Rheology, and the Effects of Fluids II		4:00 P.M.																						<input checked="" type="radio"/>										
T44B	Integrated Studies of Slow Earthquakes II		4:00 P.M.																							<input checked="" type="radio"/>									
T44C	Linking Earth Surface Dynamics and Deep Tectonic Processes III		4:00 P.M.																							<input checked="" type="radio"/>									
Volcanology, Geochemistry, and Petrology																																			
V44A	Volcanic Flow and Magma Properties: Field, Laboratory, and Hazard Assessment II		4:00 P.M.																																
V44B	Innovations and Challenges in Microanalysis and Isotope Mass Spectrometry II		4:00 P.M.																							<input checked="" type="radio"/>									
V44C	Stress, Strain, and Mass Changes at Volcanoes: Using Geodesy and Seismology to Interpret Volcanic Unrest II		4:00 P.M.																																
Friday A.M.																																			
Union																																			
U51A	Solutions for North American Water Security Challenges (Virtual Option: On Demand Only)		8:00 A.M.																																

Session Sponsors & Cosponsors

- Oral Session
- Poster Session
- ⊙ Swirl Session
- ▲ Cosponsored by AMS
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U Union	G Geodesy	NS Near Surface Geophysics	SH SPA-Solar and Heliospheric Physics
A Atmospheric Sciences	GC Global Environmental Change	OS Ocean Sciences	SM SPA-Magnetospheric Physics
AE Atmospheric and Space Electricity	GP Geomagnetism and Paleomagnetism	P Planetary Sciences	DI Study of the Earth's Deep Interior
B Biogeosciences	H Hydrology	PA Public Affairs	MR Mineral and Rock Physics
C Cryosphere	IN Earth and Space Science Informatics	PP Paleoclimatology and Paleoclimatology	S Seismology
ED Education and Human Resources	NG Nonlinear Geophysics	SI Societal Impacts and Policy Sciences	T Tectonophysics
EP Earth and Planetary Surface Processes	NH Natural Hazards	SA SPA-Aeronomy	V Volcanology, Geochemistry, and Petrology

Friday A.M.

	A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SH	SM	DI	MR	S	T	V				
SPA-Solar and Heliospheric Physics																														
SH51A																														
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SH51B																														
			Moscone South: Hall A-C																											
SH51C																														
			Moscone South: Hall A-C																											
SH51D																														
			Moscone West: 2022																											
SPA-Magnetospheric Physics																														
SM51A																														
			Moscone South: Hall A-C																											
SM51B																														
			Moscone South: Hall A-C																											
SM51C																														
			Moscone South: Hall A-C																											
SM51D																														
			Moscone West: 2018																											
Study of Earth's Deep Interior																														
DI51A ○																														
			Moscone South: Hall A-C																											
Mineral and Rock Physics																														
MR51A																														
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Seismology																														
S51A																														
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S51B																														
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S51D																														
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S51E																														
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S51F																														
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Tectonophysics																														
T51A																														
			Moscone South: Hall A-C																											

Friday A.M.		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V
T51B	New Frontiers in Asia-Pacific Earth Sciences II Posters	8:00 A.M.	Moscone South: Hall A-C							●																		
T51C	Observation and Modeling of the Influence of Stress on Seismic Ruptures I Posters	8:00 A.M.	Moscone South: Hall A-C																							●		
T51D	Observation and Modeling of the Influence of Stress on Seismic Ruptures II Posters	8:00 A.M.	Moscone South: Hall A-C																							●		
T51E	The Geodynamics of Plate Tectonics IV Posters	8:00 A.M.	Moscone South: Hall A-C								●						●									●		
T51F	The Geodynamics of Plate Tectonics V Posters	8:00 A.M.	Moscone South: Hall A-C								●						●									●		
T51G	Deformation Processes: Microstructure, Rheology, and the Effects of Fluids III	8:00 A.M.	Moscone South: 306																							○		
T51H	Fault Zone Structure from the Surface to the LAB: Constraints from Seismology, Geodesy, Field Observations, and Rock Mechanics I	8:00 A.M.	Moscone South: 302					○																		○		
T51I	Subduction Plate Boundaries From the Trench to Sub-arc and Beyond IV	8:00 A.M.	Moscone South: 304																							○		
Volcanology, Geochemistry, and Petrology																												
V51A	Developments and Applications of Nontraditional Stable Isotope Geochemistry I Posters → ↔	8:00 A.M.	Moscone South: Hall A-C																									
V51B	Garnet: Common Mineral, Uncommonly Useful I Posters →	8:00 A.M.	Moscone South: Hall A-C																								●	
V51C	Magma Differentiation: The Plutonic-Volcanic Connection I Posters	8:00 A.M.	Moscone South: Hall A-C																								●	
V51D	Volcanic Flow and Magma Properties: Field, Laboratory, and Hazard Assessment III Posters → ↔	8:00 A.M.	Moscone South: Hall A-C											●														
V51E	Stress, Strain, and Mass Changes at Volcanoes: Using Geodesy and Seismology to Interpret Volcanic Unrest III Posters →	8:00 A.M.	Moscone South: Hall A-C						●																		●	
V51F	Innovations and Challenges in Microanalysis and Isotope Mass Spectrometry II → ↔	8:00 A.M.	Moscone South: 310																								○	
V51G	Pattern to Process: Remotely Sensed Observations of Volcanic Deposits and Their Implications for Surface Processes I	8:00 A.M.	Moscone South: 308					○																				○
Union																												
U52A	400 ppm CO ₂ : Communicating Climate Science Effectively (Virtual Option: On-Demand Only)	10:20 A.M.	Moscone South: 102																									
Atmospheric Sciences																												
A52A	Atmospheric Boundary Layer Processes and Turbulence II ▲	10:20 A.M.	Moscone West: 3004						○																			
A52B	Constituent Source Characterization, Transport, and Chemistry I ▲	10:20 A.M.	Moscone West: 3010						○																			
A52C	Local Sources of Arctic Pollution and Their Impacts II	10:20 A.M.	Moscone West: 3008						○																			
A52D	Mineral Dust Aerosols: From Small-Scale Insights to Large-Scale Understanding III ▲	10:20 A.M.	Moscone West: 3012						○																			○
A52E	New Particle Formation II ▲	10:20 A.M.	Moscone West: 3006						○																			
Biogeosciences																												
B52A	Beyond Changes in Mean Climate: The Impacts of Climate Variabilities on Terrestrial Ecosystems II	10:20 A.M.	Moscone West: 2000																									○

Friday A.M.				A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V					
H52D	Measurements, Modeling, and Characterization of Hydrologic, Geomorphic, and Volcanic Responses to Earthquakes II	10:20 A.M.	Moscone West: 3014						○																										
H52E	Open-Source Programming, Scripting, and Tools for the Hydrological Sciences III	10:20 A.M.	Moscone West: 3020																																
H52F	Problems and Innovative Approaches for Obtaining and Applying Age Data in Hydrologic Systems I	10:20 A.M.	Moscone West: 3018																																
H52G	Water Resources Management and Policy in a Changing World V: Dealing With Flow and Climate Variability	10:20 A.M.	Moscone West: 3016																	○															
Earth and Space Science Informatics																																			
IN52A	Big Data in the Geosciences: New Analytics Methods and Parallel Algorithms I	10:20 A.M.	Moscone West: 2010	○		○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○			
IN52B	Semantically Enabling Annotation, Discovery, Access, and Integration of Scientific Data I	10:20 A.M.	Moscone West: 2020	○				○																											
Natural Hazards																																			
NH52A	Innovations in Tsunami Hazard Analysis, Mitigation, and Preparedness III	10:20 A.M.	Moscone South: 309																	○															
Ocean Sciences																																			
OS52A	Sediment Transport by Turbidity Currents: Simulation and Observation I*	10:20 A.M.	Moscone West: 3009						○																										
Planetary Sciences																																			
P52A	Thermal Modeling of Terrestrial and Planetary Bodies II	10:20 A.M.	Moscone West: 2009																																
P52B	Titan: A Solar System Enigma I	10:20 A.M.	Moscone West: 2007																																
Public Affairs																																			
PA52A	Geoscience Through the Lens of Art II (Virtual Option: On-Demand Only)	10:20 A.M.	Moscone South: 104					○														○													
Paleogeography and Paleoclimatology																																			
PP52A	Pliocene Climate Variability From the Tropics to the Poles I	10:20 A.M.	Moscone West: 2008																																
SPA-Solar and Heliospheric Physics																																			
SH52A	Propagation of Solar Wind Transients in the Inner Heliosphere and Implications for Future Missions II	10:20 A.M.	Moscone West: 2016																						○										
SPA-Magnetospheric Physics																																			
SM52A	Decadal Challenges for Solar and Space Physics I (Virtual Option: On-Demand Only)	10:20 A.M.	Moscone West: 2022																				○	○											
SM52B	Solar Wind Influence on Dayside Transients I	10:20 A.M.	Moscone West: 2018																																
SM52C	Space Weather Research and Operations: Transforming Physical Knowledge to Actionable Information I	10:20 A.M.	Moscone West: 2011																																
Mineral and Rock Physics																																			
MR52A	Advanced Techniques for Experimental Geophysics and Mineralogy IV: Spectroscopy and Applications	10:20 A.M.	Moscone South: 301																							○									
Seismology																																			
S52A	Interplay of Slow Slip, Tremor, and Earthquakes III	10:20 A.M.	Moscone South: 307																																

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Friday A.M.																														
S52B	Mining Signals From Noise With Cross-Correlation Techniques III																													
			Moscone South: 303																											
S52C	Seismology Contributions: Predictions and Observations of Ground Motion II																													
			Moscone South: 305																											
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T52A	Fault Zone Structure From the Surface to the LAB: Constraints From Seismology, Geodesy, Field Observations, and Rock Mechanics II																													
			Moscone South: 302																											
T52B	Subduction Plate Boundaries From the Trench to Sub-arc and Beyond V																													
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V52A	Developments and Applications of Non-Traditional Stable Isotope Geochemistry II ✦ ✧																													
			Moscone South: 306																											
V52B	Footprints of Magma Chamber Dynamics in Eruptive Products I																													
			Moscone South: 310																											
V52C	Assessing Volcanic Processes Through Novel Monitoring Approaches II ✦																													
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U53A	Comprehensive Test Ban Treaty Organization (Virtual Option: On-Demand Only)																													
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Atmospheric Sciences																														
A53A	Atmospheric Impacts of Oil and Gas Development III Posters ▲																													
			Moscone South: Hall A-C																											
A53B ⊙	Atmospheric Reanalysis: Developments and Verification Posters																													
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A53C	Constituent Source Characterization, Transport, and Chemistry II Posters ▲																													
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A53D	Linking Air Quality and Climate Change Metrics Posters																													
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A53E ⊙	Measuring and Modeling the Greenhouse Gas Emissions of Cities and Localized Rural Sources III Posters ▲																													
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A53F	New Particle Formation III Posters ▲																													
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A53G	Atmospheric Boundary Layer Processes and Turbulence III ▲																													
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A53H	Atmospheric Impacts of Oil and Gas Development IV (Virtual Option: On-Demand Only) ▲																													
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Friday P.M.		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V
SPA-Solar and Heliospheric Physics																												
SH53A	Scientific Aspects of Space Weather Forecasting III Posters	1:40 P.M.	Moscone South: Hall A-C																									
SH53B	Turbulence in the Heliosphere: Observations, Simulations, and Theory II	1:40 P.M.	Moscone West: 2009																									
SPA-Magnetospheric Physics																												
SM53A	Decadal Challenges for Solar and Space Physics II Posters	1:40 P.M.	Moscone South: Hall A-C																									
SM53B	Dynamical Processes of the Cusp/Polar Cap Ionosphere II Posters	1:40 P.M.	Moscone South: Hall A-C																									
SM53C	Solar Wind Influence on Dayside Transients II Posters	1:40 P.M.	Moscone South: Hall A-C																									
SM53D	Space Weather Research and Operations: Transforming Physical Knowledge to Actionable Information II Posters	1:40 P.M.	Moscone South: Hall A-C																									
SM53E	Spatiotemporal Behavior of the Magnetosphere-Ionosphere System II	1:40 P.M.	Moscone West: 2018																									
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S53A	Comparative Structural Seismology of China and the U.S.: Recent Advances and Future Directions I Posters	1:40 P.M.	Moscone South: Hall A-C																									
S53B	Seismology Contributions: Predictions and Observations of Ground Motion III Posters	1:40 P.M.	Moscone South: Hall A-C																									
S53C	Seismology Contributions: Signal Processing, Networks, and Instrumentation III	1:40 P.M.	Moscone South: 305																									
S53D	Oceanic Strike-Slip Faulting: Transforms to Intraplate II	1:40 P.M.	Moscone South: 307																									
S53E	Mining Signals From Noise With Cross-Correlation Techniques IV	1:40 P.M.	Moscone South: 303																									
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T53A	Deformation Processes: Microstructure, Rheology, and the Effects of Fluids IV Posters	1:40 P.M.	Moscone South: Hall A-C																									
T53B	Deformation Processes: Microstructure, Rheology, and the Effects of Fluids V Posters	1:40 P.M.	Moscone South: Hall A-C																									
T53C	Fault Zone Structure From the Surface to the LAB: Constraints From Seismology, Geodesy, Field Observations, and Rock Mechanics III Posters	1:40 P.M.	Moscone South: Hall A-C																									
T53D	Fault Zone Structure From the Surface to the LAB: Constraints From Seismology, Geodesy, Field Observations, and Rock Mechanics IV Posters	1:40 P.M.	Moscone South: Hall A-C																									
T53E	Observation and Modeling of the Influence of Stress on Seismic Ruptures III	1:40 P.M.	Moscone South: 302																									
T53F	Subduction Plate Boundaries From the Trench to Sub-arc and Beyond VI	1:40 P.M.	Moscone South: 304																									
Volcanology, Geochemistry, and Petrology																												
V53A	Footprints of Magma Chamber Dynamics In Eruptive Products II Posters	1:40 P.M.	Moscone South: Hall A-C																									
V53B	Innovations and Challenges in Microanalysis and Isotope Mass Spectrometry III Posters ⇄	1:40 P.M.	Moscone South: Hall A-C																									
V53C	Pattern to Process: Remotely Sensed Observations of Volcanic Deposits and Their Implications for Surface Processes II Posters	1:40 P.M.	Moscone South: Hall A-C																									

Friday P.M.		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V	
Education																													
ED54A	Toward a Sustained, Comprehensive, Intensive Approach to Broadening Participation in the Geosciences II	4:00 P.M.	Moscovite West: 301																										
Earth and Planetary Surface Processes																													
EP54A	Using Predictive Models to Inform River Management and Restoration II	4:00 P.M.	Moscovite West: 2003																										
Geodesy																													
G54A	Measurements and Geophysical Applications of Current and Future Global Geodetic Networks and Missions III	4:00 P.M.	Moscovite West: 3024																										
Global Environmental Change																													
GC54A	Solar Irradiance: Observations, Proxies, and Models II	4:00 P.M.	Moscovite West: 3003																										
GC54B	Imbalance in Nature as the Cause of Global Change II	4:00 P.M.	Moscovite West: 3001																										
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GP54A	Advanced Methods in Dynamo Modeling II	4:00 P.M.	Moscovite South: 300																										
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H54A	CZ-topo: Using Multiple Isotopes to Understand Watersheds II	4:00 P.M.	Moscovite West: 3018																										
H54B	Conventional and Enhanced Geothermal Systems: Characterization, Stimulation, Simulation, and Seismicity II	4:00 P.M.	Moscovite West: 3011																										
Natural Hazards																													
NH54A	Innovations in Tsunami Hazard Analysis, Mitigation, and Preparedness V	4:00 P.M.	Moscovite South: 309																										
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OS54A	The Carbonate System Chemistry of Coastal Ecosystems: Physical, Chemical, and Biological Drivers III	4:00 P.M.	Moscovite West: 3009																										
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P54A	Destination: Europa II	4:00 P.M.	Moscovite West: 2005																										
P54B	The Science of Exploration as Enabled by the Moon, NEAs, and the Moons of Mars III	4:00 P.M.	Moscovite West: 2007																										
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PP54A	Past Terrestrial Climates in the Middle Latitudes of the Southern Hemisphere II	4:00 P.M.	Moscovite West: 2008																										
PP54B	Recent Advances in the Study of Ocean Anoxic Events II	4:00 P.M.	Moscovite West: 2010																										
SPA-Solar and Heliospheric Physics																													
SH54A	Turbulence in the Heliosphere: Observations, Simulations, and Theory III	4:00 P.M.	Moscovite West: 2009																										
Seismology																													
S54A	Comparative Structural Seismology of China and the U.S.: Recent Advances and Future Directions II	4:00 P.M.	Moscovite South: 303																										

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U	Unin	G	Geodesy	NS	Near Surface Geophysics	SH	SPA-Solar and Heliospheric Physics
A	Atmospheric Sciences	GC	Global Environmental Change	OS	Ocean Sciences	SM	SPA-Magnetospheric Physics
AE	Atmospheric and Space Electricity	GP	Geomagnetism and Paleomagnetism	P	Planetary Sciences	DI	Study of the Earth's Deep Interior
B	Biogeosciences	H	Hydrology	PA	Public Affairs	MR	Mineral and Rock Physics
C	Cryosphere	IN	Earth and Space Science Informatics	PP	Paleoceanography and Paleoclimatology	S	Seismology
ED	Education and Human Resources	NG	Nonlinear Geophysics	SI	Social Impacts and Policy Sciences	T	Tectonophysics
EP	Earth and Planetary Surface Processes	NH	Natural Hazards	SA	SPA-Aeronomy	V	Volcanology, Geochemistry, and Petrology

Friday P.M.

Tectonophysics

		A	AE	B	C	ED	EP	G	GC	GP	H	IN	NG	NH	NS	OS	P	PA	PP	SI	SA	SH	SM	DI	MR	S	T	V
T54A	Observation and Modeling of the Influence of Stress on Seismic Ruptures IV																											
T54B	Subduction Plate Boundaries From the Trench to Sub-arc and Beyond VII																											
Volcanology, Geochemistry, and Petrology																												
V54A	Developments and Applications of Nontraditional Stable Isotope Geochemistry II ± ◇																											
V54B	Magma Differentiation: The Plutonic-Volcanic Connection III																											
V54C	Assessing Volcanic Processes Through Novel Monitoring Approaches IV ±																											