Time & Location: **October 29, 2012** @ Academia Sinica, Taipei, Taiwan
Scientific Domain: Earth Science (sessions: HL1.2, A2, A4, B4, C1, and **C4)**
Report prepared by: John Wang and Andrea Huang

The Earth Science related topics in Day 2 include six sessions. Among which four of them give us attentions to the challenges that our planet is under pressure. Issues such as global collaboration, relations between climate and humans, as well as pollution and monitoring are discussed. The other two sessions provide some progress that has been made by young scientists, as well as the case studies of one Taiwan research institute on how to use engineering technologies to combat disasters.

In specific response to issues of open data and information, the high level session discussed some challenges faced by the open data movement both in local and global settings, especial in light of the recently discovered coverup by Japanese government of prediction data for the spread of radioactive fume. Regardless of the action by Japanese government, the governmental organization is still the key forces in funding and providing integrated data for natural disaster reduction. Another field that requires extensive government funding is the establishment of the Ocean Tracking Network, a data sharing and international cooperation platform for improving current understanding of marine life. Two examples of how open data access helps with managing natural disasters are the integration of spatial data, and the information policy developed by the government Australia, in which the government has released related information by creative commons licences for general public's understanding.

Discussions from session A4 deal with local pollution situation in Taiwan and how data sharing could help with pollution control. Green house gases produced by agricultural activities such as farming and ranching were collected, with data gaps filled using Intergovernmental Panel on Climate Change (IPCC) estimations, and entered into a central repository where researchers can access the data and help shape the environmental policy in the future. A similar database for green house gases trapped in reservoir is currently under development, while a multidisciplinary pollution database for the greater Taipei area is operational and producing spatial analysis of environmental health.

Session C4 presents the various monitoring facilities currently available for monitoring climate change, which includes the Center for Earth Observation and Digital

Earth(CEODE) and the Migratory Birds Distribution Prediction System, both based in China. CEODE further proposes the Earth Observation Data sharing Plan, a service for users to access data. One specific talk which is slightly different from other talks in this session is the collaborative collection of traditional knowledge (TK) which is a result of collaboration from researchers and indigenous peoples. The case study of Canadian spatial data management, the Cybercartographic Atlas, using traditional knowledge of the Inuit People, has been challenged by the conflicts between ethical issues and intellectual property rights. The proposed principle for the data collaboration and sharing is that collaborators have OCAP (Ownership, Control, Access, and Possession) in general.

While considering the relation between climate problems and human responses, several platforms have been designed for data sharing and publicizing existing data. The Globe-town project, a web application developed in Southampton University for entry into a World Bank competition to raise awareness to climate change, takes publicly available climate data and presented them in a way that encourages people to find out more information on their own initiative. The locally based Taiwan Bottom Trawl Fishery Database provided an example of how fishery data can be turned into data paper, providing the investigator with academic recognition for data that is valuable but hard to turn into journal article. The RAM Legacy Stock Database, on the other hand, showed how concentrating publicly available fishery data can be used to analyze species specific fish population dynamic around the world.

Five case studies in the National Applied Research Laboratories, Taiwan discuss how to use engineering technologies to combat disasters. It focused on the development of ensemble forecasting and numerical simulation tools and models in Taiwan to prepare for and predict the effects of natural disasters, such as typhoon, tsunami, and earthquakes. Databases such as Engineering Geological Database for TSMIP (EGDT) and the National Science and Technology Center for Disaster Reduction (NCDR) were launched to provide valuable datasets that were used to fine tune the forecasting and simulation models for better prediction results, assist in disaster management, academic research, and earthquake engineering.

Session C1 was dedicated for early career scientists to present their field of research and how they perceive the open data movement. The project discussed include spatial data support facility in Japan; the planned push for e-science in South Africa and the expansion of supporting e-infrastructure; study into data reuse in China by analyzing web services like Scientific Database and Scientific Data Sharing Program; assessment of scientist's perspective on endangered data, be it due to format becoming obsolete or

data degradation, with Focus Group interviews; and the I-Grest database in Indonesia for the conservation of genetic information and traditional knowledge.

CODATA2012 會議第二天與地球科學有關之講座包括了六個議題。其中四個議題主要探討面臨壓力的星球從地方到全球所面臨的挑戰，而子議題則包括全球合作、氣候與人類的關係、汙染、與監控。另外兩個議題則由台灣的國家實驗研究院分享他們在地球觀測綜效以及對天災防治的研究; 最後一部分則由一群青年科學家所組成的研究小組，介紹目前所進行的相關研究計畫。

首先針對開放資料與資訊的觀點，高階講座 HL1.2 討論了開放資料推動所面對的地域性或全球性的挑戰。其中討論的重點包括了近期日本政府對輻射塵散佈預報結果的掩飾行為。縱使日本政府的行為不利於開放資料的推動，政府單位仍然是提供資金以及自然災害相關之資料整合的主要動力。其中，作為海洋生命探索用途的資料共享與國際合作平台--『海洋追蹤網路』的設立，更是必須仰賴各國政府的經費來源。另外像是整合開放空間資料以因應自然災害、以及澳洲政府推行以 Creative Commons 開放授權的資訊政策等，均是該國因應去年必須同時處理旱災與水災的狀況，運用開放資料而受益的實例。

議程 A4 的主題為資料分享與污染控管，主要是以台灣的實例進行討論。舉例來說，農牧業所造成的溫室氣體排放可由觀測資料以及政府間氣候變遷小組（IPCC）所訂立的估測值整合已輸入至統一的中央資料庫，因此學者以及研究單位可使用這些資訊來訂立環境保護的相關政策。同樣的，台灣政府也因此設立了統合資料庫以管理蓄水池內所含之溫室氣體，而大台北地區也設立了多元領域資料庫，以控管污染以及提供環境健康的空間分析。

C4 議程則介紹了目前用以監控全球變遷的觀測設施。其中包括了中國科學院對地觀測與數字地球科學中心 (CEODE)、以及候鳥分佈預測系統。CEODE 也更進一步提出了全球觀測資料分享計畫，提供一般使用者能使用資料庫的資料。議程中另類的資料蒐集與管理型態為傳統知識(TK)的蒐集與整理。由於地理空間地圖集(Cybercartographic Atlas)有助於原住民傳統知識的蒐集與整理，因此在加拿大的相關計畫中，對此類資料與知識的蒐集過程，所必須面對的問題是: 研究人員與原住民部落協同合作的資料與知識成果，難以避免的必須面臨道德與著作權歸屬衝突。但他們同時也提出所謂的協同合作者擁有 OCAP/所有權 O、控制權 C、資料取得權 A、以及財產權 P) 作為傳統知識資料蒐集與知識分享的協同合作原則。

倘若進一步檢視氣候問題與人類回應的關係，目前多個資料平台已著手進行資料共享與資料推廣工作。其中包括了南開普敦大學所研發的 Globe-town 網路應用程式。這是為參與

世界銀行所舉辦的提昇大眾氣候變遷認知的競賽的研發成果。此程式也將用於公開氣候變遷資料、整理並包裝成可引發大眾求知慾的發表型態。另一方面，台灣拖網漁獲資料庫提供了將資料轉換成資料文章的工具，此舉將可為專精於田野觀察的科學家取得科學界的認可。此外，紀念漁獲庫存資料庫(RAM)展示了如何透過整合公開的漁獲資訊，進行不同魚種的族群動力學分析。

台灣的國家實驗研究院則分享了五個研究案例，來說明台灣在地球觀測綜效以及對天災防治的研究，主要重點為針對颱風，海嘯，及地震等災難預測與防災準備的統合預報、以及電腦模擬工具等。同時，為了滿足用來修正電腦模擬模型以及預報精準度的數據需求，政府設立了全球強震測站場址工程地址資料庫（EGDT）以及國家災害防救科技中心(NCDR)。這些工作不僅提供了更為精準的電腦模擬模型與天災預報、同時更將有助於災害處裡，學術研究，以及地震工程等相關工作之進行。

議程 C1 發表了青年科學家們對於開放性資料的研究與看法。正在進行中的研究計畫包括了日本的空間資料輔助設施；南非共和國對於 e 化科學的推廣與 e 化基礎設施的擴建；於中國進行的，透過分析『科學數據庫』以及『科學數據共享工程』兩個網站，對於資料再利用所展開的研究；另外像是評估科學家對瀕危資料的看法與對資料共享態度所作的專題討論研究；以及印度尼西亞為了保存基因資料以及傳統知識所開發的 I-Grest 資料庫等，均是目前青年科學家研究成員所積極進行的科學資料開放的相關研究。