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El Niño/La Niña Update

El Niño-Southern Oscillation (ENSO) indicators in the tropical Pacific have generally remained at neutral levels into the early part of the second quarter of 2014; however, though it is still too early to assess the strength of any such event, a majority of models indicate that an El Niño may develop around the middle of the year. Sub-surface water temperatures in the tropical Pacific have warmed to levels similar to the onset of an El Niño event, and climate models surveyed by WMO experts predict a steady warming of the tropical Pacific during the months ahead.

Since February, there have been two strong westerly wind events, and a general weakening of the trade winds in the tropical Pacific. This has led to a significant warming of the waters below the surface of the central Pacific, which historically has been one of the precursors to El Niño development. While there is no guarantee that this will lead to an El Niño event, the longer the trade winds remain weakened, and subsurface temperatures stay significantly warmer than average, the higher the likelihood of the emergence of an El Niño.

Model forecasts indicate a fairly large potential for an El Niño, most likely by the end of the second quarter of 2014. For the June to August period, approximately two-thirds of the models surveyed predict that El Niño thresholds will be reached, while the remaining models predict a continuation of neutral conditions. A few models predict an earlier El Niño onset, such as in May. No model suggests a La Niña in 2014.

Read more in the WMO Update at www.wmo.int/pages/mediacentre/press_releases/documents/ENLNApr2014E.doc

GEOSS Opens Access to Earth Observation Data and Information

The Group on Earth Observations (GEO), now in the final two years of its first implementation phase, is working to fill significant gaps in global environmental monitoring and analysis capabilities. In implementing the Global Earth Observation System of Systems (GEOSS), the GEO community of 89 nations, the European Commission and 77 international scientific organizations is identifying areas where the ability to collect, analyze and use environmental data is lacking and taking action to address those needs.

In the three years since the last GEO Ministerial Summit, the GEO community has made significant progress toward its goal of implementing GEOSS.

Currently, the GEOSS Portal, the central hub for searching, accessing and using data, information, tools and services from national and scientific databases across the globe, enables decision-makers in government, science, non-profits and the private sector to search more than 65 million data resources. Of those, more than 50 million are tagged as GEOSS DataCORE, meaning they are accessible at low or no cost. The Discovery and Access Broker (DAB), which powers the GEOSS gateway, connects users and data providers to each other, and increases the discoverability of the ever-growing number of databases and information systems available around the world.

Agri-Met Commission Defines Priority Areas

Global food security is under constant threat from weather and climate extremes and will face further challenges from a variable and changing climate. Our ecosystem, agriculture and water supply are closely linked. In order to remain pertinent to its stakeholders – from small farms to multinational corporations – the WMO Commission for Agricultural Meteorology, which held its 16th session from 10–15 April in Antalya, Turkey, had to define its priorities for the next four years.



The Commission re-elected Dr Byong-Lyol Lee (Republic of Korea) as president and Dr Federica Rossi (Italy) as vice-president

Toward this goal, the Commission considered the outcomes and recommendations of the International Conference for Promoting Weather and Climate Information for Agriculture and Food Security,

which took place from 7–9 April, just before the session meeting. The Turkish Ministry of Forestry and Water and State Meteorological Service hosted both events. The 96 Conference participants from 64 countries were organized in 7 technical sessions in which 26 papers were presented. These generated considerable discussion on a number of issues relevant to the Commission.

Amongst others, the Conference addressed how to balance demands for producing more food while using less water per unit of output; maximizing yields while protecting the ecosystem; and increasing resilience to natural climate variability and human induced climate change while minimizing the agricultural sector's carbon footprint. The Conference also assessed the various weather and climate services currently available for the agricultural sector. It examined progress in monitoring, forecasting and preparedness, agricultural climate adaptation strategies, agro-climatic zoning for planning cropping systems, and changing land-use strategies.

In his keynote address on "*Food Security in a Warmer World: Wheat, viticulture, livestock and fisheries*", Dr Jim Salinger noted that there is a need for adaptation of cropping systems to climate change as part of good risk management. He further underlined that the management of grasslands will be crucial to supporting sustainable livestock populations with regards to climate and it is imperative to ensure sustainable marine fisheries for regional food security.

A presentation outlined how the Global Framework for Climate Service (GFCS), which includes agricultural production and food security among its four priorities areas, will address these issues through user-friendly climate services such as seasonal outlooks.

Following discussion of the Conference recommendations, the Commission established four focus areas of work: Operational Agricultural Meteorology; Science and Technology for Agricultural Meteorology; Natural Hazards and Climate Variability/Change in Agriculture; and Capacity Development in Agricultural Meteorology. It also established a new Management Group of 10 experts – 3 of which are women. Membership to expert and task teams will be established at the next Management Group meeting scheduled in fall.

The Commission awarded Certificates of Exceptional Service to Drs Kees Stigter (Netherlands) and Gian Piero Maracchi (Italy). Dr Stigter was a former president of the Commission from 1991 to 1999. The session was attended by 94 participants from 53 Member countries.

Communicators on Weather and Climate

The world's weather presenters are effective communicators ideally positioned to address the public on the issue of climate change, including its causes, impacts, and adaptation and mitigation options. Television viewers like and trust their local weather presenters, whom they recognize as experts on day-to-day weather as well as on extreme events.

To encourage weather presenters to engage more fully in the issue of climate change, the WMO organized a workshop in Paris on "How the IPCC's Fifth Assessment Report can inform news reports on weather and climate." It was held on 2–3 April, immediately after the launch in Yokohama of the second volume of the Report. Eighty TV presenters from around the world were able to participate thanks to support from the Government of Denmark. The Paris-based *Météo et Climat*, the Intergovernmental Panel on Climate Change (IPCC), and the UN Foundation also contributed to the workshop.

The first part of the workshop consisted of presentations by leading IPCC scientists who explained the results of the Working Group I report on The Physical Science Basis and the Working Group II report on Impacts, Adaptation and Vulnerability. The second part

focused on the challenge of how to communicate more effectively about climate change.

Participants responded enthusiastically to the IPCC presentations. The clearer understanding gained will permit weather presenters to recognize and acknowledge the role of climate change in their daily reports and in other forums where they are active. WMO will continue to enhance its collaboration with the IPCC and others to support the efforts of weather presenters to inform their viewers about the scientific facts of climate change. For more information see the workshop webpage at www.wmo.int/climatebroadcasts.

The Indian Ocean Data Rescue Initiative

East African and Australian droughts, flooding in India, Pakistan and Southern Africa and other such events have caused large socio-economic impacts in affected and neighboring countries. Thus, understanding the role of the Indian Ocean in triggering regional and large-scale climate variability and related extremes – such as droughts, heavy monsoons and flooding – is important to sustainable global development. A historic record of scientific observation data on the Indian Ocean would help to improve understanding of the role of key climate drivers that lead to these extremes. It would provide information on the characteristics observed in the Indian Ocean before such extremes and enable improved and timely prediction of their occurrence.

WMO and National Meteorological and Hydrological Services have made significant efforts in capturing climatic data. However, a substantial amount of the climate archives that go back to the nineteenth century is on paper and has been stored under poor conditions. They need to be recovered, imaged and digitized before they deteriorate beyond use. The implementation plan for the GFCS includes large scale Data Rescue as a priority area. The INdian OCEAN DAta REscue (INDARE) project was the focus of a workshop hosted in Mozambique from 21–24 April. In attendance were representatives from the Indian Ocean rim countries and islands: Kenya, Madagascar, Maldives, Mauritius, Mozambique, Myanmar, Pakistan, Seychelles, Sri Lanka, Tanzania and Yemen.



The workshop, sponsored by Norway and Environment Canada, outlined how to improve the quality, availability and use of data to enhance current understanding of the role of the Indian Ocean in triggering key climate drivers at regional and larger scale. Participants agreed to a new collaborative approach on these issues. INDARE will start implementation 3 months after planning is finalized by the participating countries and take three years to complete. INDARE activities will contribute to four broad areas: modernization of the

database, capacity development, climate information generation and the support of GFCS implementation.

The WMO-IOC Joint Technical Commission for Oceanography and Marine Meteorology (JCOMM), the International Atmospheric Circulation Reconstructions over the Earth (ACRE) Initiative, the International Environmental Data Rescue Organization (IEDRO), the Met Office (UK), the Climate Change Centre (Spain) and the Indian Ocean Commission (COI) are partnering to set up INDARE. Their aim is to address climate data recovery in this important, yet poorly studied and understood, region.

New Record for Two-Day Rainfall

Cherrapunji, India, now holds the world record for two-day (48-hour) rainfall, with 2 493 millimeters (98.15 inches) recorded on 15–16 June 1995. This rainfall total exceeds the previous record of 2 467mm (97.1") associated with the passage of a tropical cyclone over the Indian Ocean island of La Réunion (France) in April 1958. La Réunion continues to hold the record for the most rainfall over periods of 12-hours and 24-hours (in 1966), as well as 72-hours and 96-hours (in 2007).

The WMO Commission of Climatology international panel of experts reached its decision following an in-depth investigation of the Cherrapunji rainfall event for its inclusion in the WMO [World Archive of Weather and Climate Extremes](#), the official international listing of weather and climate extremes. The new 48-hour record is particularly noteworthy as it reaffirms Cherrapunji (also known as Sohra) as one of the wettest places on Earth. It complements Cherrapunji's long-held record rainfall for a 12-month (one-year) period, with 26 470 mm (86 feet 10 inches) of rain from August 1860 to July 1861. It also supplants a two-day rainfall record associated with a tropical cyclone. In contrast to other short-term rainfall records, Cherrapunji's extensive rains are the result of summer monsoon depressions interacting with its mountainous topography. Cherrapunji is situated on a plateau in the state of Meghalaya at an average elevation of 1 484 metres (4 869 ft), facing the plains of Bangladesh.

Mentoring and Exchange between East Africa and the UK

Severe Weather Forecasting Demonstration Project (SWFDP) aims to enable a cascading of products and services from numerical weather prediction models from global to regional to national centres, thus ensuring that the best possible information is available to national forecasters (see *Cascading Process to Improve Forecasting and Warning Services*, WMO Bulletin 62(2), 2013). Implementation of the Project in East Africa has included forecaster mentoring and exchange activities between the region and the United Kingdom of Great Britain and Northern Ireland (UK).

Initially, WMO organized daily videoconferences between forecasters in East Africa and the Met Office for the exchange of guidance materials and discussions of the latest satellite and model products. Then, in order to boost the effectiveness of the Project, WMO supported a series of staff exchanges between East Africa and the UK, funded through the Foreign Ministry of Norway.

In spring 2013, forecasters from Kenya Meteorological Service (KMS) and Tanzania Met Agency (TMA) visited the Met Office headquarters to shadow forecasters in the Global Guidance Unit and to interact with Met Office scientists, customer services and public weather

service advisors. In February and March 2014, it was the turn of Met Office forecasters to visit Kenya and Tanzania to observe their national forecasting practices and cement the Project's cascading process.



Nick Weight of the Met Office and Serge Senyana of Meteo Rwanda

In March, it was also the turn of Meteo Rwanda to visit the Met Office, so Serge Senyana spent two weeks in the UK learning how it delivers world class weather and climate services. Serge commented, "We work closely with our East African partners and Met Office to link weather forecasts to service delivery and to highlight [the] actions to be taken in case of severe weather, so that we can save lives and maintain infrastructure. We do this by predicting the risks of the weather and disasters. I am grateful for what I gained during my visit and will take back the concept of service delivery to Rwanda rather than just science."

By Caroline Bain, Met Office

Ingrid and Manuel Retired

The WMO hurricane committee announced in April that it would no longer use the name Ingrid for future tropical storms or hurricanes in the Atlantic, and the name Manuel in the eastern North Pacific, because of the death and destruction both storms caused in Mexico in September 2013.

In September 2013, Ingrid, a category one hurricane made landfall as a tropical storm in northeastern Mexico. Simultaneously, Manual made landfall as a tropical storm on the southern coast of Mexico then reformed in the Gulf of California and made a second landfall in Mexico as a category one hurricane. Significant damages and casualties resulted. Ingrid caused 32 deaths and Manuel resulted in at least 123 deaths.

Ingrid will be replaced with "Imelda" and Manuel with "Mario" when the 2013 lists are reused in 2019. (The WMO reuses storm names every six years for both the Atlantic and eastern North Pacific basins, unless a name is retired because a storm so-named is so deadly or costly that the future use of the name would be insensitive.) Full report available from NOAA at www.noaa.gov/stories/2014/20140410_hurricane_nameretired.html

The March 2013 Cold Wave Over Europe

March 2013 was exceptionally cold over most of Europe and was the second coldest March in the UK since 1910. The temperature anomalies extended over large portions of North America and Asia. The coldest lasted about a month, the cold week was 11–17 March. The cold was associated with a negative phase of the North Atlantic Oscillation

(NAO). This phase may have persisted due to several drivers that are not necessarily independent, thus the cold may have resulted from a combination of interlinked causal factors.

The Sub-seasonal to Seasonal Prediction Project (S2S) – a WWRP/THORPEX-WCRP (World Weather Research Programme/The Observing System Research and Predictability Experiment-World Weather Research Programme) joint initiative – evaluated the predictability of the event using several operational sub-seasonal to seasonal prediction systems and attempted to determine its causality. Sub-seasonal forecasts from four operational centres (NCEP, Environment Canada, ECMWF and Japan Meteorological Agency) were compared. All displayed close agreement in predicting high probabilities of cold 2-metre temperature anomalies over Europe and a large portion of Asia up to four weeks in advance, with temperature anomaly patterns consistent with observations, although the amplitude of the cold anomalies varied from one model to another. In particular, the NOA negative phase was predicted a few weeks in advance, which suggests that the event was predictable at the sub-seasonal time range.

The sub-seasonal forecasts are produced by integrating different initial conditions into numerical models many times in order to sample the forecast uncertainty due to uncertainty in initial conditions and model formulation. The 2-metre temperature anomalies over Europe produced by each model varied from one ensemble to another and quantified the uncertainty in the forecast outcome. However, there was remarkable agreement in the operational forecasts between the ensemble members predicting strong convection in the western tropical Pacific due to the Madden Julian Oscillation (MJO) and a majority of ensemble members producing cold 2-metre temperature anomaly forecasts over Europe. Further sensitivity experiments were conducted, where the weather over the Tropics was relaxed towards analysis. These experiments confirmed the crucial role of tropical convection.

In summary, this study demonstrated that this specific extreme weather event was predictable up to four weeks in advance by the state-of-the-art operational sub-seasonal to seasonal forecasting systems analyzed therein. An analysis of these operational forecasts and additional sensitivity experiments demonstrated that the cold March 2013 over Europe was linked to deep convection over the western Pacific associated with the MJO (eastward propagation of convection in the Tropics).

By Frédéric Vitart, Alberto Arribas, Mingyue Chen, Arun Kumar, Hai Li and Yuhei Takaya

Also available online

An Orbital for Jean-Michel Lefèvre

Forthcoming WMO meetings

- 66th session of the Executive Council (EC-66), Geneva, 18–27 June 2014
- 16th session of the Commission for Climatology (CCI-16) (preceded by TECO), Heidelberg, Germany, 3–8 July 2014
- 16th session of the Commission for Instruments and Methods of Observation (CIMO-16) (preceded by TECO and METEOREX), Saint Petersburg, Russian Federation, 10–16 July 2014
- 15th session of the Commission for Aeronautical Meteorology (CAeM-15) (concurrent with the WMO/ICAO Meteorology Divisional Meeting, 7–18 July), Montreal, Canada, 15–16 July 2014
- Extraordinary session of the Commission for Basic Systems (CBS-Ext. (2014)), Asunción, Paraguay, 8–12 September 2014
- 16th session of the Regional Association III (RA III-16), Asunción, Paraguay, 15–20 September 2014

Newly issued

WMO Bulletin – Weather and Climate: Engaging Youth, Volume 63 (1), ISSN 0042-9767. Available in English. Per issue – surface mail: 15 Swiss francs (CHF), airmail: 24 CHF. Annual subscription – surface mail: 30 CHF, airmail: 48 CHF

WMO Statement on the Status of the Global Climate in 2013, WMO No. 1130, ISBN 978-92-631-1130-2. Available in Arabic, Chinese, English, French, Russian and Spanish. 15 CHF

The Global Climate 2001–2010: A decade of climate extremes, WMO-No. 1103, ISBN 978-92-631-1103-6. Now also available in French. 40 CHF

The WMO Strategy for Service Delivery and its Implementation Plan, WMO No. 1129, ISBN 978-92-631-1129-6. Available in English. 40 CHF

Regional Association VI (Europe) - Sixteenth session: Abridged final report with resolutions and recommendations, WMO No. 1125, ISBN 978-92-63-11117-8. Available in Arabic, English and Russian. French in preparation. Multilingual CD-ROM: 16 CHF

Sixth Session of the Joint Scientific Committee (JSC) for the World Weather Research Programme (WWRP), WWRP, 2014-1. Available in English

Economic Dimensions of Improved Meteorological Services in the Pacific, by Paula Holland, SPC SOPAC Published Report (PR 185). Commissioned by WMO with financial support of US National Weather Service. Available in English

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Mark these dates

- 6 June: World Oceans Day – Ocean Sustainability: Together let's ensure oceans can sustain us into the future (www.un.org/Depts/los/wod/index.html)
- 17 June: [World Day to Combat Desertification](#) – Land belongs to the Future, let's climate proof it

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