

**Whitepaper on Joint U.S./New Zealand Climate Activities**  
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It is widely recognized that the Pacific Island region is a critically vulnerable area of the world when it comes to the issue of climate change. Furthermore, given that the Pacific is the home of the El Niño Southern Oscillation (ENSO) phenomenon, an understanding of the science behind climate in the region has significant global implications. Climate change is science based so it is vitally important any climate change policies must be based on sound scientific advice. Since at least 2000, several scientists from the Meteorological Service of New Zealand (MetService); National Institute of Water and Atmospheric Research (NIWA); and National Oceanic and Atmospheric Administration (NOAA) have been involved in a wide range of operational and research related science and capacity building activities with respect to the climate change science in the Pacific Islands region.

Much of this work has been documented under the New Zealand/U.S. Climate Change Partnership (CCP) bilateral first signed in August 2003. In addition, this work has been augmented by cooperation with the Australian Bureau of Meteorology, as well as regional (e.g., SPREP and SOPAC) and national (e.g., Pacific Islands National Meteorological Services) organizations across the region. The scope of this proposed work has helped to raise awareness and the visibility of this invaluable work being done across the Pacific Islands region to improve overall climate services including: (1) improving climate observing infrastructure; (2) enhancing the exchange of critical climate data; and (3) exploring what further opportunities exist to further and enhance the work in the region.

Finally, many of these activities support the World Meteorological Organization's Global Framework for Climate Services that was agreed to at the 3<sup>rd</sup> World Climate Conference in September 2009, where it was agreed to strengthen production, availability, delivery and application of science-based climate prediction and services via:

- The Global Climate Observing System
- The World Climate Research Program
- A Climate services information systems
- Various climate-user interface mechanisms which link providers and users of climate services
- An efficient and enduring capacity-building strategy achieved through education, training, outreach, and communication

A summary of on-going projects is as follows:

- 1) **GCOS Technical Support Project** – Since 2003, this is the flagship bilateral climate observing effort co-sponsored by the U.S. GCOS Program Office at NOAA/NCDC and the New Zealand MetService. This facility has been instrumental in improving the operation of GCOS observing systems across the region by providing logistics, maintenance, data management, and training support to developing nations across the region. This work also involves a capacity building aspect that involves supporting a regional Pacific Island GCOS Program Leader based in Apia, Samoa, and a web interface at <http://pi-gcos.org> which provides a platform for regional meteorological services to run their own national web sites.
- 2) **Shipborne Trace Gas Measurements** – Since 2004, this effort between the U.S. GCOS Program Office, the New Zealand National Institute of Water and Atmosphere (NIWA), and NOAA/ESRL, has facilitated the installation of sampling equipment being installed on a Japanese commercial vessel crossing the Pacific and NIWA and ESRL have completed several collaborative sampling trips from New Zealand to Japan crossing two key climatic convergence

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zones for analyzing a suite of 13 greenhouse gases and associated isotopes (including carbon dioxide, methane and nitrous oxide) in an area of the world that had no such data before with very interesting results particularly centered around the global and regional movement of methane in the atmosphere.

- 3) **Stratospheric Water Vapor Monitoring** – The U.S. GCOS Program and NIWA have been working very closely in trying to improve the monitoring of water vapor which from a climatic standpoint is an extremely important climate forcing factor, and unfortunately inadequately monitored on a global basis. Together, the U.S. and New Zealand have been key contributors to the GCOS Reference Upper Air Network (GRUAN) program [see <http://gruan.org>] to help in this global effort building on several years of like cooperation between NOAA and NIWA in taking such pilot observations at the well known observatory in Lauder, New Zealand.
- 4) **Historical Data Rescue and Associated Climate Research Efforts** – NOAA, NIWA, and New Zealand MetService have worked collaboratively in a number of important climate efforts that include the spin-up of an Atmospheric Circulations for the Reconstruction of the Earth (ACRE) Pacific program [see <http://www.met-acre.org/>] that works to rescue and digitize previous paper-only climate records that can be incorporated in global climate databases to enhance the ability of climate models for producing better climate outlooks and associated products. Related work in this area includes collaborative work in improving regional climate outlooks via the monthly Island Climate Update process which involves cooperative work across the region (by developing and developed nations) to improve climate outlooks on behalf of societal applications. Finally, work in improving the regional database of tropical cyclones coupled with rescued precipitation data has resulted in a project known as the South Pacific Rainfall Atlas (SPRAT) which will serve to improve the prediction of the movement of the South Pacific Convergence Zone and thus improved prediction of drought as well as tropical storms as conditions change and fluctuate from El Niño to La Niña.

In January 2010, there was a high-level U.S./New Zealand Joint Commission (JCM) Meeting on Science and Technology (S&T) that was held in Wellington, New Zealand. The JCM meeting consisted of a number of one-day technical workshops on a number of S&T topics, one of these topics dealt with Climate Change in the Pacific and many of the activities and organizations described in this whitepaper were key participants. The result of those workshops was the development of a Roadmap of Cooperative Activities for 2010-2020; and the U.S. lead for the Climate Change in the Pacific activity was the U.S. GCOS Program Manager at NOAA/NCDC. The overall long-lead activities for this Climate Change in the Pacific activity center around harmonizing international (leveraging on existing US and NZ partnerships) efforts in the Pacific to maximize the impact of climate change research, and to contribute to a well resourced Pacific Climate System. Two short-term goals of this involve: (1) facilitating a multilateral data workshop for data management activities, preservation and governance in Pacific contexts; and (2) finding an effective administrative support mechanism to link congruent US and NZ projects by connecting research teams.

In conclusion, the over decade-long cooperation between various parts of NOAA with climate science colleagues from both NIWA and New Zealand MetService have resulted in many positive interactions and outcomes that has resulted in benefits for the Pacific Islands region as well as for the international climate science community.