SECRETARIAT OF THE PACIFIC COMMUNITY
SECRÉTARIAT GÉNÉRAL DE LA COMMUNAUTÉ DU PACIFIQUE

Applied Geoscience and Technology Division (SOPAC)
Division Géosciences et Technologies Appliquées (SOPAC)

Second Meeting of the SOPAC Division
Noumea, New Caledonia, 3-9 November 2012
(SOPAC-2)

AGENDA ITEM	TITLE
3.	SOPAC DIVISION HIGHLIGHTS AND EMERGING ISSUES
3.1	Ocean and Islands Programme 2011/2012 Report
3.1.1	Summary Report of OIP activities

PURPOSE

The purpose of this report is to provide the SOPAC Division Meeting delegates with a summary account of the implementation of the Ocean and Islands Programme (OIP), under its 2012 Work Plan (September 2011 – August 2012).

Some Key Highlights for 2011/2012*

- Tuamotu archipelago – reducing the risk of storm wave and surge
- Finalisation of eight maritime boundaries agreements
- Vulnerability assessment and adaptation to sea level rise project in Lifuka, Tonga
- Deep Sea Minerals Project – completing the regional legislative and regulatory framework

*Details provided in the full narrative report provided in paper SOPAC-2/3.1.2 (English only)

BACKGROUND AND COMMENTS

The Ocean and Islands Programme role

The Ocean and Islands Programme (OIP) works across a broad range of marine, coastal and island resource use and applied science and vulnerability issues. It offers a range of specialist technical capacities, skills and tools in support of member's contemporary needs. In the context of both the SOPAC Division (Applied Geoscience and Technology Division) and the broader SPC, OIP has a unique role and a diverse technical mandate, delivering a distinct and complementary service to the other Technical Programmes and Sectors of the SOPAC Division as well as the broader SPC (e.g. Economic Development Division, Fisheries, Aquaculture and Marine Ecosystems Division, Land Resources Division, etc).

The OIP technical role is directed towards the collection and analysis of baseline data such as bathymetric products, maritime boundaries data, oceanographic and geophysical data, topographic data, geological and geomorphologic assessments, environmental baseline data such as marine ecosystem habitat mapping. This data collection is usually undertaken at the request of SPC Members to support specific decision making or to evaluate options regarding development, vulnerability or adaptation tasks and projects. OIP uses this data to perform empirical analysis such as hydrodynamic modelling, statistical and quantitative analysis. It then processes the outcomes into reports, charts, recommendations and country briefings as appropriate. OIP is also involved in on-going monitoring such as the Pacific Sea Level Monitoring project (formerly the South Pacific Sea Level and Climate Monitoring Project) and, as

this Sector suggests, OIP is heavily engaged in climate change adaptation assessment and project implementation. The OIP also supports improved decision making and policy development in key sector areas. For example, it implements the *Deep Sea Minerals in the Pacific-ACP States: a Legal and Fiscal Framework for Sustainable Resource Management* Project which is developing fundamental legislative frameworks to guide the conduct of this new and growing industry.

The Ocean and Islands Programme delivers such work through multiple mechanisms including direct capacity supplementation to PICs, partnerships with PI governments and agencies (e.g. SPREP, UNEP, Commonwealth Secretariat, Department of Climate Change and Energy Efficiency, Australia, NIWA, Geoscience Australia, etc.) and through multidisciplinary approaches where OIP delivers "end to end" services or fulfils a portion of a broader programme or project of work. In certain circumstances OIP also competes for commercial contracts where the objectives of those contracts are aligned with country assistance needs and OIP's existing mandate.

The Ocean and Islands Programme integrates to its work important complementary tools such as resource economics, remote sensing and GIS and maintains a multi-million dollar technical workshop facility which provides crucial support to SOPAC Divisional in-house technical and scientific teams as well as direct support to PICs on technical issues. The active preservation and management of geoscience data, particularly geospatial data sets and information is an important OIP task and OIP continues this work through a web accessible "Geonetwork" data management system: http://geonetwork.sopac.org/geonetwork/srv/en/main.home.

The SOPAC 2010 – 2015 Strategic Plan articulates the following three Division-wide key result areas (KRAs):

- Monitoring and Assessment of Natural Hazards, Resources and Processes
- Management and Development of Natural Resources
- Management of Vulnerability and Risks

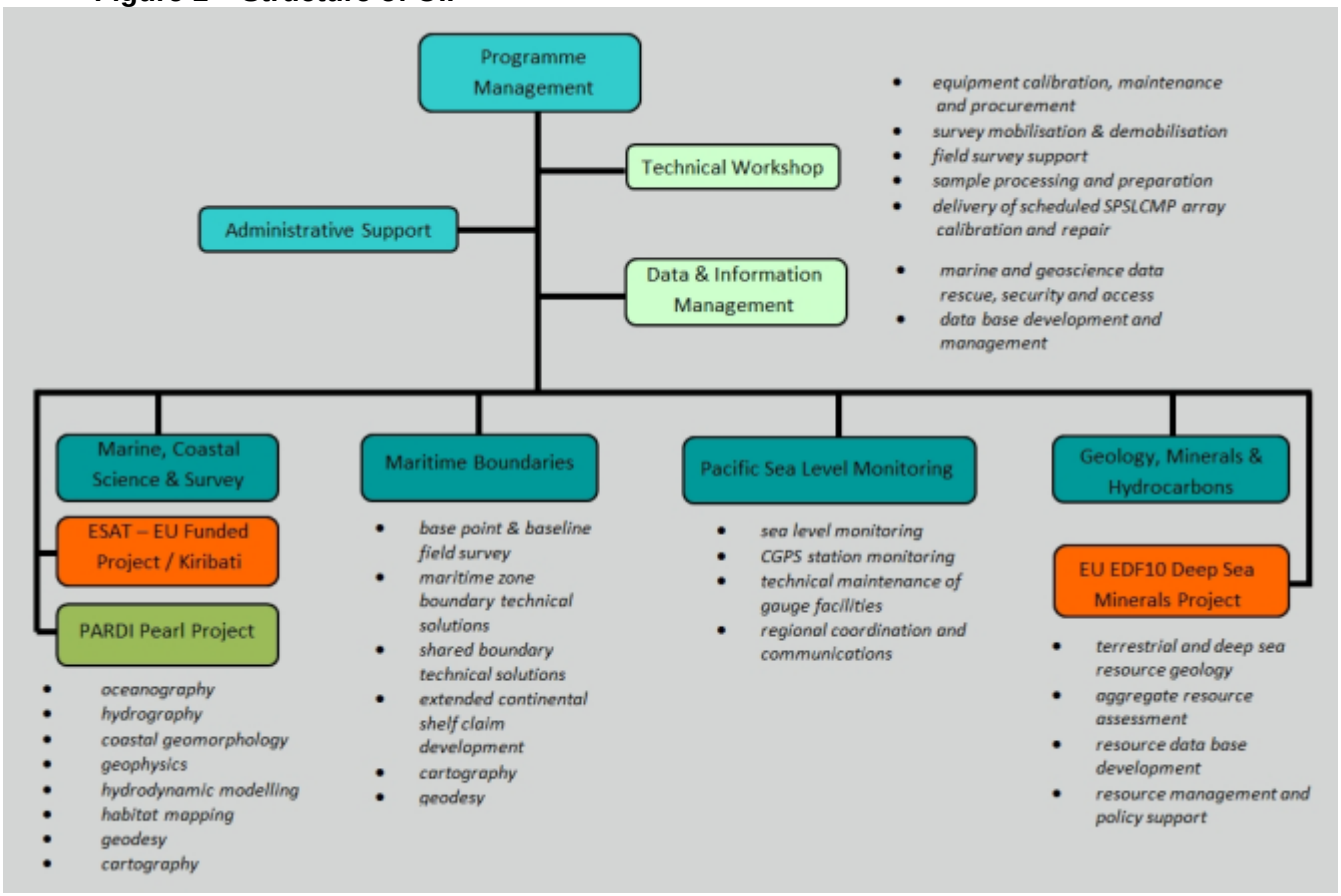
The KRAs present an opportunity to articulate broadly how OIP tasks contribute to development. Nevertheless, the fact that OIP work has multiple applications in practice and that it is also often highly connected with other programmes of the SOPAC Division means that it may contribute to several KRAs simultaneously. Nevertheless, an indication of the contribution of OIP work to the SOPAC KRAs is highlighted in Annex 1 of the full OIP narrative report (paper SOPAC-2/3.1.2 (English only)) through a column which indicates the KRA(s) to which a task most strongly contributes. In this same column is an indication of the applicability of the task to climate change science and/or adaptation.

Structure

The OIP is organised into 7 main thematic areas or Sectors which provides a useful division of tasks or services. These Sectors also reflect the manner in which Members predominantly articulate requests against OIP's resources and mandate. Nevertheless, it cannot be stressed enough that the capacities and teams within these Sectors cross and frequently simultaneously work in two or more Sectors. The critical mass of OIP is such that teams can be assembled across several Sectors to deliver against specific tasks and then re-disperse back to their usual areas upon completion. This also occurs at a cross Programme level and OIP routinely joins with WSP and DRP to develop and deliver against member requests and Projects. This is the essence of multi-disciplinary approaches used in the design and delivery of SOPAC Divisional work

This summary report provides an outline of the tasks completed by OIP in the period from September 2011 to August 2012 and emphasises key obstacles and achievements faced in the 12 months.

Figure 1 – Structure of OIP



Sector 1. MARINE, COASTAL SCIENCE AND SURVEY (MCSS)

The largest Sector within OIP, 5 staff deliver in the main functional areas of oceanography, hydrography, coastal processes and geomorphology, geophysics, hydrodynamic modelling, habitat mapping and geodetic survey. Additionally, the PARDI (Supporting Cultured Pearl Industries of Fiji and Tonga) project requested in late 2011 that its Pearl Culture Specialist be physically located in OIP to facilitate oceanographic work for the development of the regional pearl industry. This position has also been placed in the MCSS Sector. The Technical Workshop facility is also particularly associated with the MCSS Sector, providing additional personnel and expertise during equipment mobilisation and instrument deployment in the field.

As reported in 2011, there is an increasing trend of requests for OIP, particularly the MCSS Sector, to address issues of climate change adaptation and vulnerability assessments using the Sector's scientific capacity and tools. Of the 23 major tasks and proposals reported this year, 16 are directly relate to climate change adaptation or vulnerability assessment in coastal zones. Seven of these reported tasks are in the proposal stage and being considered for funding and potential implementation. These proposals are also reported as 2012 tasks, in the hope that it will be recognised that proposal development is a huge burden on OIP staff, with a significant proportion of their time and effort spent designing and writing proposals.

Despite continual requests for improved programmatic funding to support OIP's capacity and allow the Sector to expand and increase its ability to accept/design more proposals and implement additional projects, the OIP received a reduction in programmatic funds in 2012. At the time of writing it is important to report the MCSS Sector is now operating at maximum capacity and will struggle to accept further substantive Projects depending on the outcome of existing proposals (see Annex 1 of the OIP full narrative report (Paper SOPAC-2/3.1.2 in English) for details of these).

In response to programmatic funding cuts OIP has been encouraged to take more project orientated work and the Programme has responded positively to this challenge. In 2005, project funding accounted for 62% of the programme total budget whereas in 2012 it accounts for 2.4%. This increasing ratio of project to programme funding brings about constraints because projects often do not cover full-time staff costs and where they do, they rarely provide the flexibility for those staff to support requests for similar work in a complementary areas (those staff are limited to operating only a single project). In turn, OIP has a good reputation for delivering projects effectively however, when the proportion of project funding relative to core funding becomes too high, delivery quality becomes increasingly difficult to ensure. For these reasons the MCSS Sector cannot commit to the development of additional substantive projects until the outcome of present proposals is understood or the core team can be grown through improved programmatic funding.

In spite of this significant challenge to the MCSS Sector, a characteristically diverse range of tasks have been completed to high standard or have been underway through 2012. The range includes near-shore bathymetric/topographic surveys in Fiji, Cook Islands, Tonga, French Polynesia and Yap (Federated States of Micronesia) and rapid coastal assessment work in Kiribati (Kiritimati Island), Palau (Rock Islands) and Kosrae (Federated States of Micronesia). Associated geophysical surveys have also been completed including outer island dredging and jetty development surveys in Ovalau, Savusavu and Naduri (Fiji); reef platform drilling in Yap (Federated States of Micronesia) and field and scientific support to the PARDI Pearl development work has been provided in Tonga, Fiji and the Cook Islands. The MCSS Sector's hydrodynamic modelling capacity continues to grow and storm wave inundation modelling (French Polynesia, Cook Islands, Tonga) and tsunami inundation modelling is underway.

The MCSS has partnered with New Zealand's National Institute of Water and Atmospheric Research (NIWA) to deliver coastal hazard assessments in Mangaia (Cook Islands) and the Navua and Rewa Deltas in Fiji. Funded under the SPREP Pacific Adaptation to Climate Change project, the activities included intensive data collection such as: bathymetric survey, topographic survey, monitoring wave and currents and the subsequent modelling inundation due to storm waves (Mangaia) and modelling of catchment/rainfall and storm tide induced inundation (Navua and Rewa Deltas). In both cases, it is the first time that such sophisticated data based approaches to hazard assessment have been deployed in these locations and both studies will provide empirical guidance to communities and stakeholders on how to manage hazards. These tasks have also provided an excellent opportunity for OIP's Hydrodynamic Modeller to work with NIWA and further develop the MCSS Sector's modelling capacity, including the use of open source modelling platforms which negate the licencing costs of commercial software and reduces costs to Members.

The MCSS Sector has also completed an intensive schedule of field work in Rangiroa Atoll (French Polynesia) under the EDF9 Supporting Disaster Risk Reduction in Pacific OCTs Project (overall implementation responsibility of the Project lying with the Disaster Reduction Programme). The OIP has worked closely with the *Service de l'Urbanisme* in French Polynesia, deploying to Rangiroa in May 2011 oceanographic instruments and commencing baseline survey work. This included: water current and wave data collection, offshore and lagoon bathymetry survey, sediment sampling and drop camera benthic surveys and intertidal flat boulder surveys. Data processing is underway now and, once complete, inundation and storm surge modelling tasks will commence. Ultimately, the lessons from this work will be broadly transferable across the region and is expected to contribute to an atoll storm surge hazard regulation framework for the Tuamotu Group.

Over 2011-2012, the MCSS Sector joined with the Water and Sanitation Programme of the SOPAC Division and staff of the Human Development Division to deliver a comprehensive program of work on coastal vulnerability in Lifuka, Tonga. This work – which seeks to improve understanding of shoreline vulnerability – was designed in consultation with the Department of Climate Change and Energy Efficiency (Australia), under the PACCSAP (Pacific Australia

Climate Change Science and Adaptation Planning Program). Similarly, the AusAID funded Tsunami Hazard Assessment Project (Phase III) which is delivered jointly with Geoscience Australia and the Disaster Reduction Programme, has developed highly accurate topographic and bathymetric baselines for Nuku'alofa, Tonga; and these are now being used to assess the exposure to tsunami generated from different sources. This work is also undertaking important comparative work to ascertain what level of resolution and accuracy in baseline data is the minimum required for accurate inundation modelling.

In December 2012, the MCSS will begin implementing the European Union funded Changing Waves and Coasts in the Pacific (WACOP) project. A regional programme implemented by OIP which will support on-going work in shoreline vulnerability by contributing to regional understanding of potential climate change and climate variability impacts related to 'wave climate'. This project has direct links to other proposals in the MCSS Sector, such as the: Operational Wave Forecasting for Early Warning Systems (EU Natural Disaster Risk Reduction Program), Vulnerability Assessment of the Bonriki Freshwater Reserve and International Airport to Climate Variability and Change (DCCEE/PACSSAP), as well as likely regional coastal vulnerability work under the proposed Pilot Program for Climate Resilience (World Bank, Asian Development Bank) and Building Safety and Resilience in the Pacific Project (10th EU EDF Intra-ACP Envelope). This programme also links to on-going efforts to maintain the PRISMS (Pacific Regional Island Shoreline Monitoring System) initiative. A collaborative agreement between the University of Auckland and OIP will also facilitate further work in PRISMS with the analysis of existing historical data over the next two years.

These tasks and proposals highlight the predominance of coastal vulnerability science and climate change adaptation and risk tasks. Whilst demand for these services is high, the MCSS Sector is still delivering against other key result areas. For example, OIP recently completed the geophysical survey of Yap State (Federated States of Micronesia) Petroleum Corporation coastal defence works and following the success of this work, Yap State authorities have requested further drilling and testing of several bridge footings. The MCSS also undertook strategic hydrographic and seismic surveys in the outer islands of Fiji in support of improved transport and docking facilities and similarly completed technical assessment work this year following a 2011 assessment of the Port Ronton entrance, Kiritimati Island (Kiribati). Additionally, OIP assisted the Rock Island State Authorities, Palau in collaboration with GIZ (Coping with Climate Change in the Pacific Island Region Project) to undertake a rapid assessment of key tourist beaches in the intensively used and economically important Rock Islands marine park area.

In addition to its scheduled work, the MCSS Sector typically undertakes a range of unscheduled tasks and attempts to remain responsive to Member requests for technical review of documents such as EIAs, coastal engineering plans and development applications and proposals. These requests are numerous and variable in content, size and complexity (see paper SOPAC-2/3.1.2). OIP recognises it is the only regional capacity of its type available to Members and thus significant resources are expended to honour unscheduled requests for assistance. Such activities and services in 2012 have been supported through the New Zealand Ocean Sciences Project. Likewise, the MCSS Sector also (by default) provides regional geodetic survey support to Members as it has the only regional capacity in this field. Sustained support from the Membership would greatly facilitate the continuation of such services and responsiveness that OIP can maintain.

Sector 2. GEOLOGY, MINERALS AND HYDROCARBONS

At present, the Geology, Minerals and Hydrocarbons Sector(GMH) has no core staff but houses both the EU-funded Environmentally Safe Aggregates for Tarawa (ESAT) Project, Kiribati, with a Project Manager posted in South Tarawa and the EU-funded EDF10 Deep Sea Minerals in the Pacific Islands Region project (with three staff). At both the SOPAC Commission Annual Session of 2010 and the SPC SOPAC Divisional Meeting of 2011, OIP highlighted that it could not support a core position in the GMH Sector to provide Members with assistance on issues such as aggregates geology or terrestrial minerals geology. This situation has not changed. In fact, with funding for this programme reduced in 2012, there is less likelihood of adequate resourcing for a core position. Nevertheless, the Sector did respond to one urgent unscheduled request to provide expert advice and a site visit to support the Solomon Islands Ministry of Mines, Energy and Rural Electrification conduct a preliminary investigation of gold recovery variance at the Gold Ridge Mine. This work was completed and OIP also provided assistance to the Solomon Island Government to develop the terms of reference for a subsequent consultancy and full study.

ESAT Project

The ESAT Project is jointly implemented by OIP and the Government of Kiribati's Ministry of Fisheries and Marine Resource Development (MFMRD). This project is designed to protect the vulnerable beach systems of South Tarawa from damage caused by aggregate mining by providing an alternative supply of construction aggregate from the lagoon basin to meet South Tarawa's rapidly growing demands. Large and unsustainable volumes of beach aggregate (sand, gravel and cobble – estimated at 70,000 m^3/year in 2006) are removed from South Tarawa's beaches every year at a time when fears over shoreline instability and sea level rise suggest that every possible effort to protect shoreline systems should be made. ESAT offers a pragmatic "no-regrets" climate change adaptation response to this problem by seeking to provide an environmentally sustainable alternative which can reduce pressure on South Tarawa's fragile beaches and bolster resilience in natural beach systems. Day-to-day management of ESAT is provided by a specifically recruited, Tarawa-based Project Manager who in turn is supported by both the broader OIP technical team and MFMRD. The Project also partners with local Tarawa based NGOs and has employed a number of consultants to provide specialist support over the last 12 months.

The single largest budget item in this project is the provision of a purpose built aggregates dredge the *MV Tekimarawa*, a 40-m steel, open-water capable vessel with a shallow draft for lagoon work and a total payload of 300 tonnes. The contract to build the vessel was awarded to Heavy Load Pte. Ltd, Singapore on the 24th June 2011 and significant progress has been made with hull and superstructure of the *MV Tekimarawa* nearing completion and anti-corrosion treatment and painting is now underway. The twin engines and dredge crane system have also been assembled and are expected be fitted during the 4th quarter 2012. The contract completion date has been delayed to November 2012 (1 month delay due to poor weather and flooding at the yard). Quality control on the construction has been maintained by an independently contracted shipwright with routine site and vessel inspections carried out and OIP's estimate of a possible delivery date would be the 1st quarter 2013.

There are many dimensions to the ESAT Project. It is recognised that simply providing a vessel will not likely result in an immediate reduction in beach mining and there remains the important issue of the number of people dependent on beach mining for income in South Tarawa. To this end, ESAT also implements an awareness and behaviour change programme focused at community understanding and participation (*Ara Bike Reirei*) and also undertakes routine awareness events with schools. The project also supports school curriculums through its efforts with the "SandWatch" programme. Comprehensive and strategic efforts to maintain community outreach and consultation are also underway, involving contracts to local NGOs who implement the ESAT Communications Strategy. This work has also included multiple community meetings

to discuss the implications of the dredge resource EIA and the associated study on fisheries resources in the aggregate resource area (undertaken collaboratively with the Kiribati Government and the Fisheries, Aquaculture and Marine Ecosystems (FAME) Division of SPC). These documents and process also inform the ESAT Environment Management Plan being drafted now.

The ESAT Manager has also undertaken liaison with major development projects which are planned to become active in South Tarawa (e.g. runway resurfacing, road repair, Temaiku reclamation) to discuss the engagement of the *Atinimarawa* Aggregates Company to provide safe aggregates. Securing such contracts will be vital to the early success of the *Atinimarawa* Aggregates Company and not only support the local economy but also assist to avoid quarantine risks (imported aggregate). In turn, this will also allow the Company to better resource strategies to assist beach miners who presently derive income beach mining. It is planned that the Company can provide raw lagoon aggregate to these miners who can subsequently sort and on-sell the improved product – as they presently do with beach aggregate.

Deep Sea Minerals Project

The EU-funded EDF10 Deep Sea Minerals in the Pacific-ACP States Project is in its second year, with the Project Manager in post since early 2011 and the Project Officer and Legal Advisor joining later in the year. The Deep Sea Minerals (DSM) Project has made impressive headway in 2012, with a highlight being the completion of the Regional Legislative and Regulatory Framework (RLRF). The RLRF has been reviewed and endorsed by all 15 Pacific ACP States and, having been also reviewed by NGOs, the private sector, other regional/ international agencies and academia, reflects commentary from multiple interests and stakeholders. The RLRF is the first document of its type in the world and is a first critical step towards assisting the Pacific ACP States to prepare national policy and legal instruments for DSM regulation.

Development of the RLRF is significant for the Pacific since many Members have no experience of industrial mining or their deep sea minerals or deep sea environment potential. It follows that knowledge of deep sea environments, ecosystems and potential impacts of mining such deposits is also poorly understood and in an effort to consolidate all knowledge of these resources and environments to better inform members, the Project has contracted UNEP GRID Arendal to coordinate the compilation of the world's first comprehensive review of all aspects of these deep sea environments and potential resources in the Pacific region. The review includes consideration of ecological, biological, geological, mineral and technological issues and will also consider potential socio-economic and environmental implications and impacts. This review is a major endeavour and brings together data, research and experts from around globe. In turn, this product along with the RLRF will become the cornerstones of policy development for Members.

Intrinsic to development of sound policy decisions is ensuring that all stakeholders are provided with the best possible information. As well as the work already described, the Project has undertaken awareness raising country visits and multi-stakeholder meetings in 13 of the 15 Project countries. (The final 2 visits to Papua New Guinea and Timor Leste are scheduled for September 2012.) Where requested, Project staff have also developed country work plans to progress national policy and legislation as well as build national capacity in this sector.

Over 2011, the Project assisted the International Seabed Authority in the organisation of an international workshop on *Environmental Management Needs of Deep Sea Minerals Exploration and Exploitation*. The workshop was attended by 27 representatives from 9 Pacific ACP States. In July 2012, the Project also organised and hosted a regional week-long workshop on *Geological, Technological, Biological and Environmental Aspects of Deep Sea Minerals.* Attended by member Nations, NGOs and other regional agencies, the workshop brought together world leading geological and biological experts to share their knowledge and hold open

discussions with participants. Finally, the Project is also producing country specific brochures explaining what is currently understood of their DSM resources.

At the time of writing, the DSM Project has received requests to undertake legislative reviews and/or drafting of legislation related to DSM for: the Cook Islands, Fiji, Federated States of Micronesia, Kiribati, Nauru, Niue, Palau, Marshall Islands, Samoa, Solomon Islands, Tuvalu and Vanuatu. Additionally, legal advisors from Nauru, Tonga, Kiribati and Fiji have indicated their interest in drafting national regulations for exploration of the International Seabed Authority's high seas area in the eastern tropical Pacific, the 'Clarion Clipperton Fracture Zone', otherwise known simply as "the Area".

Finally, capacity building is being supported under the DSM Project to ensure skill sharing in all aspects of DSM and a legal internship programme was established in 2012 with nationals from Tuvalu (January), Tonga and Vanuatu (underway) working under the guidance of the DSM Legal Advisor. Interns from Fiji and Kiribati are also scheduled to join the programme in late 2012. Additionally, a Kiribati National was sponsored for marine safety training in preparation of a shipboard attachment/observation.

Sector 3. PACIFIC SEA LEVEL MONITORING (formerly the SPSLCMP)

This AusAID funded sea level monitoring array was originally implemented due to increasing regional concern over climate change associated sea-level rise and the poor understanding of this phenomena and sea-level variability in the region. Gauges were installed between 1991 and 2001 and, since establishment, the array has captured a mostly uninterrupted stream of high quality, accurate data on sea level, temperature (water and air), barometric pressure and wind speed and direction. Associated Continuous GPS (CGPS) stations have also been established in each country to account for any tectonic movement.

On the 1st of July 2012, the Phase IV – *South Pacific Sea Level and Climate Monitoring Project* (SPSLCMP) transferred to the new *Climate and Oceans Support Program in the Pacific* (COSPPac) Project under the *Climate and Ocean Monitoring and Prediction* (COMP) sub component. OIP's role in the sea level monitoring remains largely unchanged with the exception that the Sector is now called the *Pacific Sea Level Monitoring* (PSLM) project.

As with previous arrangements, the entire COSPPac programme, and thus PSLM, remains wholly AusAID funded (approximately AUD32million) and the current cycle of COSPPac will run until December 2016. OIP and Geoscience Australia (GA) are contracted partners with the Bureau of Meteorology Australia (BoMA). Together, these partners take responsibility for the continued calibration, maintenance and, when necessary, unscheduled repair of the 12 PSLM high-resolution sea-level monitoring stations and associated CGPS (Continuous GPS) stations in the Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu and Vanuatu.

In July 2012 the OIP-based SPSLCMP Regional Communications Coordinator position became vacant and due to the transfer of the SPSLCMP to the COSPPac project, there have been minor changes in the position title and terms of reference, with the coordinator now referred to as the *COSPPac Regional Officer*. Recruitment for the Officer position is now underway.

Continuing from last year and now associated with the PSLM is the Australian Government's ICCAI-funded *Operational Network Upgrade Project* (ONUP). ONUP began field work in early 2011 and is refurbishing and upgrading the measurement and communication technologies at all 12 PIC stations to ensure their continued capacity to measure, record and transmit high-quality sea level and climate data for another 10 to 15 years. The upgrade also enhances the array's capacity to detect *tsunami* and other unusual wave conditions. Over the last report period ONUP has completed upgrades in: Samoa (August 2011); Kiribati (October 2011); Solomon Islands (December 2011); Fiji (February 2012); Vanuatu (May 2012); and Papua New

Guinea (July 2012). (Tonga and Fiji were completed last year and reported at the first SOPAC Divisional Meeting held in 2011). OIP's Technical Workshop also provides in-country assistance with the technical retrofitting of the ONUP gauge stations and communications gear.

It is important to note that the work of the OIP and its partners – and consequently the operation of the network – has remained uninterrupted during these changes. Through the Technical Workshop and the PSLM Surveyor, OIP have continued to provide routine and non-routine maintenance and calibration to the facilities. Over the last reporting period visits have been undertaken to the station facilities in: Samoa (November 2011), Nauru (February 2012), Solomon Islands (March 2012), Kiribati (April 2012), Tuvalu (May 2012 and August 2012), Marshall Islands (June 2012), Solomon Islands (Jun2 2012), Federated States of Micronesia (August 2012) and Fiji (Suva and Lautoka – August 2012). Likewise, the full range of data and analysis and other high quality products remains available via the BoMA web site and the OIP Geonetwork:

http://www.bom.gov.au/oceanography/projects/spslcmp/spslcmp.shtml
http://geonetwork.sopac.org/geonetwork/srv/en/main.home.

These products include data, country reports, consolidated data reports and tidal calendars. The most recent *2010 – 2011 Consolidated Data Report* is highly recommended reading and includes an interpretation of the recent highest peak sea levels recorded in the PIC region by the array and one of the strongest La Nina events on record.

Sector 4. REGIONAL MARITIME BOUNDARIES

The OIP Regional Maritime Boundaries Sector (RMB) is entirely AusAID funded through both the recurrent programmatic budget and via a number of successful AusAID Pacific Public Sector Linkage Program (PPSLP) proposals. The Sector has been implemented by OIP since 2001 and serves to assist PICs with the technical development of maritime zones, baselines (including archipelagic baselines where applicable) and the computation of subsequent marine zone limits (territorial seas out to 12 nautical miles (NM); contiguous zones out to 24 NM and exclusive economic zones out to 200 NM). The RMB also assists PICs to calculate the technical solutions to overlapping or shared maritime zones and assists those PICs with extended continental shelf (eCS) potential to delineate these areas and submit claims to the UN Commission on the Limits of the Continental Shelf (UNCLCS).

The RMB Sector undertakes all work in accordance with the provisions of the UN Convention on the Law of the Sea (UNCLOS) and ultimately the RMB aims to assist PICs to develop, promulgate and declare their respective boundary information and likewise develop technical solutions towards ratified treaties between PIC neighbours with overlapping marine zones.

Successful maritime boundaries development work is a process which includes technical (geomorphological/geodetic/cartographic), legal (legislative review and legal drafting) and diplomatic understanding and engagement. The processes cannot be brought to a successful conclusion, nor can sustainable progress be achieved, where any one of these three components is absent. Unfortunately, the OIP mandate is restricted to the technical components only and the legal work related to areas such as eCS development (and defence) is extensive and complex. As a result, successful delivery of the PIC maritime boundary programme is only possible through a broad, collaborative network of partners who come together with OIP to provide a complete support mechanism to PICs. These partners (Geoscience Australia, Australian Attorney General's Office, UNEP GRID Arundel, Commonwealth Secretariat and the Forum Fisheries Agency) join OIP to run and resource the Regional Maritime Boundaries Workshop series. These occur approximately every 8 months and the *9th Pacific Island Country Advanced Article 76 (UNCLOS) and Maritime Boundaries Development Workshop* was held from 20 February to 2 March 2012. (The 10th Workshop is scheduled for November 2012).

For the last 6 six years, the University of Sydney has graciously provided a free venue and computer laboratories for these workshops in their Geology Building. The last workshop involved 36 regional participants and 17 facilitators from the technical partnership. As discussed at the SOPAC Divisional meeting of 2011, these workshops have evolved from an earlier specific need to provide intensive training to a select group of PICs who had eCS potential (Cook Islands, Fiji, Federated States of Micronesia, Kiribati Palau, Papua New Guinea, Solomon Islands, Tuvalu, Tonga and Vanuatu). Last year OIP and GA made the strategic decision to expand both the focus and membership of the meetings to include all PICs (so now includes the Marshall Islands, Nauru, Niue and Samoa). This means the workshop series continues to support eCS development but also dedicates time and effort to assist countries to progress their respective maritime zone and delimitation work.

The Forum Fisheries Agency (FFA) is the most recent agency to join the partnership and this coincides with the broadening of the regional workshop focus. The FFA has engaged with both OIP and the Australian Attorney General's Office (AAGO) to focus on the issue of regional shared boundary negotiation and agreement. Excellent progress has been achieved through these coordinated and multi-disciplinary efforts, with seven bilateral and one trilateral treaty being signed by respective leaders at the 2012 Pacific Forum Leaders meeting. This brings the number of ratified treaties in the region from 21 to 28 (20 more remain). The bilateral treaties were signed between Nauru/Marshall Islands; Nauru/Kiribati; Kiribati/Marshall Islands; Kiribati/Tuvalu; Kiribati/Tokelau (NZ); Kiribati/Cook Islands and Cook Islands/Niue. The trilateral treaty was signed between Nauru/Marshall Islands and Kiribati and denotes the single point of confluence of their respective bilateral treaties.

At the time of writing, only Fiji, Nauru and Palau have declared their maritime baselines, zones and outer limits in accordance with UNCLOS and, following the signing of the above treaties, Nauru is the only PIC with complete and declared boundary solutions in place. Papua New Guinea, Solomon Islands and Vanuatu have declared only their archipelagic baselines and, of these countries, Fiji, Solomon Islands and Papua New Guinea are all the focus of major work by the RMB Sector to review these baselines and improve their accuracy for subsequent declaration. Both Tuvalu and Kiribati have also been the focus of delimitation work assisted by the RMB Sector in the last 12 months. The Sector, in collaboration with the country technical teams (and funding assistance from the Commonwealth Secretariat to purchase baseline data), has developed complete maritime zone and limit solutions appropriate for declaration. In the case of Tuvalu, these boundary solutions have been approved by Cabinet and declaration with the UN is expected soon. Likewise, both Tuvalu and Kiribati have deadlines for submission of their eCS claims in 2013 (January and March, respectively). Tuvalu is developing a joint claim with France and New Zealand and Kiribati is working with the Commonwealth Secretariat and UNEP GRID to complete their independent submission.

In collaboration with the AAGO and GA, OIP has also provided assistance to both Samoa and Niue and both these countries have now completed boundary solutions and updated legislation adequate for declaration. In the last reporting period, the Marshall Islands has also engaged with OIP to develop its maritime zones, limits and solutions. This work started with the completion of baselines and computation of the equidistant boundaries to support the treaty work with Kiribati and Nauru and will now continue with a full review of their existing boundaries data and updating where needed.

Sector 5. DATA AND INFORMATION MANAGEMENT
http://geonetwork.sopac.org/geonetwork/srv/en/main.home

The Ocean and Islands Programme made an investment in 2007 into a more strategic approach to data management and, in late 2008, the OIP Geonetwork system became operational and available for public viewing and use. Geonetwork has hugely improved the Programme's data and product visibility, as well as its ability to collate, protect and provide access to its historical and newly collected data and analysis products. The work to continue population of the system and response to increasing volumes of requests grows yearly and it is important to note this strategic response to a web-based data discovery and archiving system is demand (not supply) driven, as evidenced by use statistics. During the 2012 reporting period, Geonetwork content increased 20 per cent from 7,010 items to 8,387 entries, covering products from the entire membership. Bathymetric data entries in particular increased (now 237 records) and about half of this year's written requests were for bathymetry data. Otherwise, the system recorded 407 data set downloads from open records (a 295 per cent increase over last year's total), and 46 written requests for protected data in 2012 (a 21 per cent increase over last year's total of 38).

As reported in 2011, the original Geonetwork server was reaching capacity and OIP had even then invested significant programme funds to purchase of new server array to handle increased capacity needs. Unfortunately, migration of Geonetwork content has been far slower than expected due to unforeseen access issues. Consequently, the Geonetwork upgrade to Geonode is neither complete nor operational at this time. In 2011, OIP gained approval from CRGA to enhance its user interface for specialist geospatial data such as maritime boundary information. Recognising this is a specialist technical/legal area, OIP has collaborated with the UNEP GRID Sydney Office, Geoscience Australia and the SOPAC Division ITC Development team to submit a AUD $236,390 proposal (AusAID PPSLP) to facilitate UNEP GRID and GA expertise to assist OIP to further develop this interface and discovery platform for geospatial data sets. Otherwise, funding for Geonetwork in 2012 has been maintained with the assistance of the NZ Government's Ocean Sciences grant.

Sector 6. TECHNICAL WORKSHOP

The Technical Workshop plays a significant role in supporting work in the OIP MCSS, Pacific Sea Level Monitoring, GMH and RMB sectors. Other substantive users are the Water and Sanitation and Disaster Risk Reduction programmes. Implicit in the reporting of all OIP and, in fact, most SOPAC Divisional field assessment tasks, is acknowledgment that the Technical Workshop is indispensable to implementation success, particularly where there are substantive mobilisation and deployment tasks are concerned (e.g. geophysical, bathymetric, topographic surveys etc.). The Technical Workshop also has a direct role in the procurement, servicing, modification, repair, calibration and cataloguing of oceanographic, geodetic, climate and geological equipment and instruments held by the SOPAC Division. It deploys, mobilises and demobilises millions of dollars' worth of equipment safely and successfully every year. The tasks of the Technical Workshop are too numerous to fully list here, but the MCSS, PSLM and Technical Workshop sectors reporting in Annex 1 of the full OIP narrative report (Paper SOPAC-2/3.1.2) gives an itemised account. The Technical Workshop facility received a welcome boost to resources in 2012 via the NZ Government's Ocean Sciences grant.

Among its many tasks, the Technical Workshop oversees OHS issues and is instrumental in the upkeep of safety equipment and routine safety training for all field staff. Joining the Bureau of Meteorology in Australia in the delivery of ONUP (Observational Network Upgrade Project), staff also assessed and corrected OHS issues at each PSLM project station and OIP science staff joined with the Technical Workshop to undertake training in small boat safety and handling (March 2012), as well as in Advanced First Aid and Resuscitation (April 2012). A new Technical Officer in the MCSS Sector was also given SCUBA training under the Workshop-managed Taiwan ROC Grant for safety training and equipment improvements. The Workshop has also supported important geodetic work and provided assistance to the PARDI Pearl Development

project with fieldwork and oceanographic monitoring in Savusavu, Fiji, as well as the repair of water quality monitoring buoys for eventual use in the Pearl industry.

Sector 7. MANAGEMENT/ADMINISTRATION/ADVOCACY/REPORTING

This Sector is responsible for the day-to-day facilitation, management and oversight of the Ocean and Islands Programme, as well as for the longer-term strategic alignment and responsiveness of the Programme's services and work plan. Staff here consists of the Programme Manager (Deputy Director) and the Programme Assistant; however, the size and complexity of OIP has resulted in team leader positions taking responsibility for the immediate management of the MCSS Sector and the Technical Workshop. These sectoral senior staff also take an active role in developing their respective sectors and the Team Leader MCSS is particularly active in developing major sector proposals. The Management Sector is also tasked to form practical links across programmes and divisions within SPC and interacts closely with Corporate Services, the Divisional Management Team and the broader SPC.

Strategic technical partnerships are crucial to the on-going development and delivery of work in OIP and the Management Sector liaises with other regional and international partner agencies and interest groups on a range of matters within its work mandate and interests, participating in working groups and other regional fora and contributing to regional reporting and strategic planning mechanisms such as the CROP Marine Sector Working Group, SPC CRGA, SPC Joint Country Strategy process, Pacific Plan reporting, regional institutional review processes and so on.

UNSCHEDULED AND AD HOC REQUESTS

Where possible and practical, OIP provides on-going support to countries in response to individual country or regional requests outside of the scheduled work plan and budget. Below are examples of the nature of such requests/obligations over the 2011 – 2012 reporting period. Many of these tasks are covered in more detail in the full narrative report (paper SOPAC-2/3.1.2); with those originating from the MCSS Sector largely funded under the NZ Government 2012 *Regional Ocean Sciences Project* allocation.

Country Support to:

- *Yap, Federated States of Micronesia*: Request to develop work plan and costs for geotechnical survey and drilling to support the design of infrastructure (bridge footings) in Yap State. The OIP drill which is in Yap on a separate task has been placed in storage whilst the proposal development work is completed.
- *Kosrae, Federated States of Micronesia*: Review of a coastal rehabilitation report, site visit and development of specific recommendations for coastal adaptation actions in Kosrae. Subsequent development of collaborative project with NIWA under GIZ funding.
- *Palau, Rapid assessment of shoreline erosion in Omekang, Ngermeaus and Ngerkesill islands, Rock Islands*: OIP was approached for assistance to undertake a rapid assessment of several important recreational beach areas in the Rock Islands area and develop key recommendations for further work and mitigation. Work completed and proposal development for further work underway.
- *Cook Islands, Support Manihiki pearl farms and lagoon management*: Produce a detailed bathymetric map of Manihiki Lagoon for the purposes of lagoon pearl farm management and support on-going work to upgrade lagoon water quality monitoring buoys.
- *Fiji, Support coastal infrastructure development*: OIP was requested to undertake a geotechnical assessment to inform decision making with regard to: dredging in Ovalau;

and port development in Savusavu and Naduri on Vanua Levu. Further requests have been received to assess jetty sites in Southern Lau.

- *Niue, Wharf infrastructure upgrade support*: Reef geophysical survey and drilling to support design and decision making for the planned upgrade of Niue's main port facility. Work plan and budget development completed and equipment purchase underway now.
- *Kiribati, Vulnerability assessment of the Bonriki freshwater reserve and international airport to coastal hazards and climate variability and change*: Joint OIP/WSP proposal development.
- *Solomon Islands, Development of adaptation and vulnerability reduction options Taro and Choiseul Bay*: Joint OIP/WSP proposal development.
- *Cook Islands, Review EIA for alternative tourist landing site in Rarotonga*.
- *Marshall Islands, Technical advisory to RMI on Ebeye coastal erosion issue*.
- *Papua New Guinea*: Develop costings for a re-survey of Yonki hydroelectric dam to ascertain and monitor siltation rates and dam performance.
- *Fiji, Operational wave forecasting for early warning systems, Viti Levu*: Proposal development.
- *Cook Islands*: Requested OIP to rerun the Aitutaki hydrodynamic model to evaluate additional navigation channel designs – results generated and delivered.
- *Kiribati*: Independent assessment and feed back to the Government of Kiribati on three EIAs in Tarawa Kiribati – Ambo Seawall; Maiana Maneaba Reclamation; and Temaiku Reclamation Projects.
- *Solomon Islands, Preliminary investigation of gold recovery variance, Gold Ridge Mine*: Site visit and provision of expert advice and support to the Mines Division of the Ministry of Mines, Energy and Rural Electrification.

Regional Support:

- *PRISMS Pacific Regional Island Shoreline Monitoring System*: Advanced with a collaborative agreement between the University of Auckland and OIP completed in June 2012 and will facilitate analysis of PRISM's existing data over the next two years. All processed data products will be returned to OIP for uploading to Geonetwork. The islands of Tuvalu will be the first locations for analysis under this agreement, with other locations to follow.
- *PPCR Pilot Program for Climate Resilience*: Strategic Program for Climate Resilience joint OIP/WSP proposal development.
- *Sub-regional (Tonga, Fiji and Cook Islands)*, *PARDI – Supporting Cultured Pearl Industries of Fiji and Tonga Project*: Support provided by OIP (mainly MCSS and Technical Workshop sectors) to improve understanding of water quality and flow regimes pertinent to pearl culture.
- *Capacity Building in Hydrography for Coastal Development*: OIP proposal development.
- *Building Safety and Resilience in the Pacific Project*: Action fiche development DRP, WSP and OIP.
- *University of the South Pacific*: Cable route survey for new backup fibre optic cable completed field work March 2012.
- Significant in-house development of OIP HD modelling capacity and thus improved regional service has occurred with training and collaboration undertaken with both NIWA and GA.

- UNDP/DRP/Kiribati collaboration in support of south/south country visit and exchange on freshwater and coastal vulnerability issues.
- Support Asia Pacific Regional GNSS Survey Campaign – 9th to 15th September 2012.
- On-going technical support to PACCSAP (AusAID/DCCEE) and contribution to technical think tank on coastal science in PICs.
- Support various regional and international climate change related events and fora such as the Climate Change Round Table, IPCC, etc.
- Support shared boundary treaty signing event, printing, scanning and other logistics for the Forum Leaders meeting, Rarotonga, late August.
- Pacific Islands Marine Spatial Information System. Proposal development.