

CREON & GLEON WORKSHOP

March 29-31, 2006

Townsville, Australia

Local Hosts: Queensland Parallel Supercomputing Foundation, James Cook University, and the Australian Institute for Marine Science

Sponsors: Australian Institute for Marine Science, Sun, Sunferries, SGI, The Gordon and Betty Moore Foundation

Report of Coral Reef Working Group

www.coralreefeon.org

Sally J. Holbrook and Stuart Kininmonth

Representatives from the following groups attended sessions of CREON during the joint meeting of CREON and GLEON:

AIMS: Stuart Kininmonth, Scott Bainbridge

UC Santa Barbara: Sally Holbrook, Russ Schmitt, Andrew Brooks, Ryan Kastner

NCHC Taiwan: Fang-Pang Lin,

Taiwan National Chung Hsing University: Hsing-Juh Lin

Research Center for Biodiversity Taiwan: Kwang-Tsao Shao

Taiwan National Museum of Marine Biology & Aquarium: Pei-Jie Meng

Univ. of Queensland: Bernard Pailthorpe, Glen Holmes

James Cook University: Ian Atkinson, Gilles Gigan, Graham Woods, Debora De Freitas, Peter Ridd,

The Gordon and Betty Moore Foundation: Jim Omura

CSIRO: Tim Wark

Univ. Twente: Supriyo Chatterjea

SUNY – Binghamton: Kenneth Chiu

Univ. of Melbourne: Matt Duckham, Palaniswami Marimuthu,

UC San Diego: Peter Arzberger

Scripps Institute of Oceanography: Frank Vernon

Indiana University: Rick McMullen

Goals for the workshop:

The Coral Reef Working Group had six major goals for the Townsville workshop:

- (1) Review progress since our previous meeting in March 2005 in San Diego
- (2) Identify several long-term research sites that will form the nodes of an initial Coral Reef Sensor Network

- (3) Identify specific instrumentation to be deployed and any potential obstacles for deployment at each site
- (4) Develop a timeline for deployment of the sensors at each of the initial sites
- (5) Identify and discuss possible solutions for problems encountered by the groups to date, and explore how to exchange technical and logistic expertise among the groups
- (6) Develop an agenda for the next meeting of the group planned for October 2006, as well as other goals for March 2006-March 2007.

Progress on each of these goals is addressed below.

(1) Progress since the March 2005 meeting in San Diego:

The Coral Reef Working Group reviewed goals set in its March 2005 meeting and articulated in the report of that workshop. The first year goals from the report are given below.

YEAR 1 (March 2005-March 2006)

One Month:

- (1) Produce report of the workshop (Holbrook, Kininmonth)
- (2) Data standards group established (Bainbridge, McIntyre, Washburn, Durnota)
- (3) Data management group established (Bainbridge)
- (4) Platform group formed (Rodoplu)
- (5) Liaison group formed – representatives of each site (Holbrook, Kininmonth to coordinate)

Six Months:

- (1) Data management group meets (Bainbridge)
- (2) Establish web presence for the group (CoralReefNet)
- (3) Acoustic modem prototype developed (Kastner, Iltis)

The One Month goals are complete, including a workshop report (posted at www.coralreefeon.org), and formation of groups for data standards (Bainbridge, McIntyre, Washburn, Durnota), data management (Bainbridge, Pailthorpe), platform development (Rodoplu, Gilles) and to serve as a liaison with GLEON (Kininmonth, Holbrook). The level of activity of the data standards and data management groups is expected to rise dramatically after the Townsville workshop because several groups will be deploying sensors in the coming months.

Bernard Pailthorpe agreed to chair the Data Management Committee. He will coordinate interactions with the appropriate people in GLEON and during the next year the group will work to establish data standards and database structures. The group will include Ian Atkinson, Andy Brooks, Fang-Pang Lin, Matt D as well as Bernard Pailthorpe.

Regarding Six Month goals, the data management group did not meet, but as noted above, more activity for this group is anticipated in the near future. A web presence for CREON was established as noted above. The development of the acoustic modem by the UCSB group (Kastner, Iltis) is progressing rapidly and can be tracked at the AquaNode website at <http://aquanode.ece.ucsb.edu/>.

In addition, substantial progress has already been made on several of the goals articulated for Year 2. The second year goals listed in the San Diego workshop report are:

YEAR 2: (March 2006–March 2007)

- (1) Standards document produced (data QA/QC)
- (2) ORB, SRB (Atkinson, McMullen, Pailthorpe)
- (3) MAC/topology control, DLL (Rodoplu, Iltis)
- (4) Application layer demo (Durnota)
- (5) Portal (McMullen)
- (6) UW video (Fujikawa)
- (7) Group meets (October 2006, March 2007)

During breakout sessions much information was provided by the different groups regarding ongoing projects and progress in the six Year 2 technical themes. A number of the demonstrations also addressed these topics.

- (2) Identify several long-term research sites that will form the nodes of an initial Coral Reef Sensor Network**
- (3) Identify specific instrumentation to be deployed and any potential obstacles for deployment at each site**
- (4) Develop a timeline for deployment of the sensors at each of the initial sites**

The group decided it was realistic to deploy moored CTD (conductivity, temperature, depth) instruments in the near future at three sites: the Great Barrier Reef, Kenting ReefILTER site, and the Moorea Coral Reef LTER site. CTD's are ideal instruments to deploy because they can provide reliable, low-cost real time data transmission. They are robust enough for deployments of months. They are widely used by the oceanographic community, and the data they provide are of interest to reef scientists because they can be used in modeling and hypothesis testing for a variety of research questions. The goal is for deployments to be made within 6 months (August) on the GBR and at Moorea, and within 9 months (November) at Kenting NP.

The group decided that a subgroup with representatives from each of the initial three sites would be formed to decide on the brand of instruments to be deployed, the frequency of measurements, etc. The goal is to get data streams up on the internet as quickly as possible. Immediate challenges include hosting the data, and ways to maximize its usefulness (e.g., making it a resource that can be queried).

(5) Identify and discuss possible solutions for problems encountered by the groups to date, and explore how to exchange technical and logistic expertise among the groups

This agenda item was approached by the group by formation of a flow chart showing various steps of data collection, transfer, control and computation. Each group indicated areas of expertise and current research/development efforts. The following is a brief outline of universities with researchers involved in each area of activity relevant to the CREON mission.

RESEARCH DATA – Univ. Queensland, AIMS, UC Santa Barbara

SPATIAL COMPUTATION – Univ. Melbourne

GIS/VISUALIZATION – AIMS, University of Queensland, UC San Diego, Queensland Parallel Supercomputing Foundation

DATA CONTROL – James Cook University (DART), Univ. of Melbourne, Monash University, QPSF

DATA TRANSFER – James Cook University, UC Santa Barbara, UC San Diego, Univ. Twente

DATA COLLECTION – CSIRO, AIMS, UT

ELECTRONICS – Univ. of Melbourne, UC Santa Barbara, James Cook University, Univ. Twente, CSIRO

SENSORS - CSIRO

HOUSING/DEPLOYMENT – AIMS, James Cook Univ., Univ. Queensland, CSIRO, UC Santa Barbara, Kenting

VIDEO – UC Santa Barbara, AIMS, James Cook University, NIST, Taiwan

(6) Develop an agenda for the next meeting of the group planned for October 2006, as well as other goals for the next one year period (March 2006-March 2007).

GOALS for YEAR 2: (March 2006–March 2007)

One month:

- (1) Data Management group formed
- (2) Fall 2006 CREON meeting committee formed
- (3) Report of Townsville meeting posted on web
- (4) Refine website; add links to other sites

Six months:

- (1) Data Management group interacts with GLEON counterpart
- (2) Fall 2006 meeting in Taiwan, science questions refined
- (3) CTD's deployed at two sites, streaming data
- (4) Draft white paper by data group
- (5) Data hosting by UCSD, NCHC, QPSF
- (6) Develop additional funding
- (7) Outline research products/possible papers

One year:

- (1) Sensor network of CTDs, 3-4 nodes
- (2) Functional federated web front end w/ SRB interface
- (3) Re-evaluate and refine data structure

Future goals include: scaling up by adding other nodes to the network, submission of papers for publication, development of scientific questions, modeling, and synthesis to be addressed by network, addressing growth and sustainability of the network.