2007 Progress Report

Global Ocean-Atmosphere Prediction and Predictability (GOAPP) Network

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Date of Submission: June 26, 2007
Approved by the GOAPP Board of Directors June 21, 2007

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This first progress report of the Global Ocean-Atmosphere Prediction and Predictability (GOAPP) Network covers the period from October 1, 2006 (the Network start date) to June 30, 2007.

In accordance with instructions from the Canadian Foundation for Climate and Atmospheric Sciences (CFCAS), this report answers a series of questions posed under the general headings of Progress, Impact, Level of Support, Dissemination, Training and Other. As requested by CFCAS, the report is a non-scientific description of progress.

For each one of the 13 GOAPP projects we have presented the specific objectives and milestones for year 1 and the progress achieved to date. Two projects (I.2.3 and II.1.1) were removed from the network at contract award.

We have also included in this report appendices containing Acronyms and Abbreviations (Appendix A), lists of personnel involved in the Network (Co-Investigators, Researchers, Scientific Steering Committee Members, Board of Directors, and Collaborators) (Appendix B), and the GOAPP Workshop Agenda (Appendix C). The text of the GOAPP Data Management Policy has been submitted in a separate document.

1 PROGRESS (BEGINNING OF INITIATIVE TO END JUNE 2007 (OR PREVIOUS 12 MONTHS))

1.1 DESCRIBE PROGRESS TOWARDS MEETING THE PROJECT OBJECTIVES. HOW ARE THE ORIGINAL MILESTONES BEING MET? LIST THE KEY OBJECTIVES AND RESULTS ACHIEVED TO DATE AS WELL AS ANY RELEVANT APPLICATION(S) OF THE RESULTS.

Given the Network has been in place for only nine months, the overall progress has been excellent. The Network Secretariat has been established and many of the new research personnel (graduate students, post doctoral fellows, and research associates) are now in place. The original drafting committee for the proposal has transformed into a fully functional Scientific Steering Committee that is overseeing research progress under the guidance of a newly established Board of Directors (see Appendix B). A revised set of milestones (taking into account external reviews and funding levels) was submitted to the Board of Directors in March 2007. The revised milestones reflect the maturation of the Network's ideas and plans, and also the decision to base much of the Theme I research on the imported Mercator ocean modelling and data assimilation system.

Individual projects have generally made excellent progress with some of them exceeding their year 1 milestones. One important accomplishment was the GOAPP annual workshop which took place in St. John's, NL on May 28, 2007. This not only allowed individual researchers to learn of each others' progress, but also, it provided an excellent opportunity for the two Themes to coordinate their research plans. This bodes well for the future success of the Network.

In the rest of this section we describe the progress achieved by individual projects, grouped by Theme. It will become clear when reading these descriptions that many of the co-investigators and their research personnel are working on more than one project and thus the research is truly collaborative and integrated.

Theme I: Days to Seasons

This subsection describes progress made under Theme I. Although a number of ocean models are described, they are, with two exceptions, all based on the NEMO code. The first exception is a reference to the POP ocean model, which is in the form of a legacy code resulting from an earlier CFCAS project of Wright and Thompson. The second exception is a simplified ocean model with an adjoint that will be used to better understand the sensitivities in the NEMO model. Both of these exceptions will only be used for a limited time; almost all of the ocean modelling effort will be focussed on the NEMO code. All of the atmospheric research and modelling in Theme I is based on the GEM model. Thus, the researchers in Theme I have made an effort to limit the number of models and make best use of their limited resources.

Sub-Theme I.1 Ocean Modelling and Data Assimilation

Project I.1.1 Suppression of Bias and Drift in Ocean Model Components
Co-Investigators: D. Wright, K. Thompson

Specific Objectives: (i) Implement and test the spectral nudging technique in the basin-scale and global ocean models developed in Theme I, (ii) Make the developments available to project I.1.4 on ocean hindcasting and forecasting using basin-scale and global models, and also to sub-themes I.2 and II.3.1 focused on coupled global atmosphere-ocean modelling and data assimilation.

Schedule and Milestones:

Year 1: Implement spectral nudging in basin-scale and global models and test that it works similar to expectations from previous work.

Hiring of Personnel:

Each of the investigators contributing to this project has hired support staff. Y. Liu is working with K Thompson and is an expert in data assimilation who transferred to this project from a previous CFCAS-funded project (Assimilation of Upper Ocean Data into a model of the North Atlantic) that dovetails nicely with the present initiative. D. Wright and E. Demirov each began their search for suitable personnel in late 2006. D. Wright has now hired F. Dupont as a Research Associate and E. Demirov has hired J. Zhu as a Post Doc to begin on July 1, 2007. F. Dupont has a strong background in ocean modelling and an interest in learning about data assimilation; J. Zhu has expertise is in ocean data assimilation and an interest in ocean modelling.

Progress to date:

1) The NEMO code has been implemented on various computational platforms available to us and preliminary tests have been completed.

2) The basic spectral nudging code has been implemented. Several tests have been completed using both a global 1 degree configuration and a ¼ degree configuration for the North Atlantic and results are encouraging. Further tests are required to verify that all options are working correctly but no serious problems are foreseen.

3) Communication with G. Madec, the primary author of the NEMO code, suggests that new wind stress estimates for the equatorial region should greatly reduce the development of model bias in this region. If this turns out to be correct, this sub-project will be completed ahead of schedule.

Project I.1.2 Statistics of Observed Variability for Model Testing and Improvement
Co-Investigators: K. Thompson, M. Foreman and E. Demirov

Specific Objectives: Use statistics describing the mean state of the ocean and its variability to test the realism of eddy resolving models of the North Atlantic and North Pacific, and improve the models and their forcing functions. The observed statistics are (i) the mean sea surface topography based altimeter data and the most accurate regional geoids available, (ii) variance and skewness of sea level measured by altimeters, and (iii) mean, variance and skewness of surface drifter velocities.

The milestones for year 1 are (i) collate mean and variability statistics for the North Atlantic. (ii) Undertake numerical experiments to test sensitivity to variations in a small number of controls for the North Atlantic (using a ¼ degree NEMO configuration). (iii) Extend the forward and the tangent linear/adjoint models of Yaremchuk and Nachaev (simplified OGCM) to include bottom topography.

Hiring of Personnel:

(i) Dr Y. Liu joined the project in October, 2006. He is based at Dalhousie University and is working with K. Thompson on this project (I.1.2) and the related projects, I.1.1 and I.1.3.

(ii) Dr T. Wakamatsu joined the project in October 2006 and is co-funded by GOAPP and DFO. T. Wakamatsu works most closely with M. Foreman at the University of Victoria. He is working on this project (I.1.2) and the related project I.1.3.

(iii)The search for a postdoctoral fellow to work with E. Demirov at Memorial University of Newfoundland started in late 2006. J. Zhu will fill the position on July 1, 2007 following the defence of his PhD thesis planned for the end of May.

Results Achieved to Date:

(1) Average summer and winter mean sea surface topographies (MSST) have been calculated for the Northeast Pacific using climatological temperatures, salinities, winds, and satellite altimetry. The MSST, based on altimeter and grace gravity data, of the North Atlantic has been made available from a related study funded by the GEOIDE network of centers of excellence.

(2) The standard deviation and skewness of sea level data for the North Atlantic has been calculated using altimetric data processed by Y. Liu.

(3) Surface drifter data for the global ocean (including the North Atlantic and North Pacific) have been made available by Peter Niiler of the Scripps Institution.

(4) The statistics of the sea level and drifter data will be used to test and improve the NEMO circulation model of the North Atlantic presently being configured by E. Demirov as part of project I.1.3. We anticipate that this model will be available for initial sensitivity studies in July, 2007.

(5) Discussions have taken place with Dr Max Yaremchuk of the University of Hawaii and he has kindly agreed to make his forward and adjoint model available to us. (This model will be used to systematically reduce the size of temperature and salinity nudges, and also optimize parameters, open boundary conditions, and forcing fields.) He has also agreed to help us extend the forward model and adjoint to include realistic bathymetry and coastlines. We anticipate that preliminary calculations using this model will be made first for the North Pacific as soon as the codes are transferred from the University of Hawaii.

Project I.1.3 Multivariate Assimilation of Altimeter and Argo Data for Ocean Forecasting
Co-Investigators: E. Demirov, K. Thompson and M. Foreman

Specific Objectives: (i) Determine means and error covariance structure of the altimeter and Argo data to be assimilated into the global and basin models using 3DVar (ii) Test and compare performance of new assimilation schemes for altimeter and Argo profile data.

The milestones for year 1 are (i) Calculate the background error covariance for the auxiliary variables (ξ_D, ξ_T and ξ_S) using the ¼ degree North Atlantic model developed in project I.1.2. The covariances will be estimated using the new maximum likelihood approach. (ii) Use these covariances to assimilate Argo and altimeter data for the North Atlantic using the new auxiliary variable- based scheme. (iii) Implement the SEEK filter for the North Atlantic (building on the SAM2 code to be provided by Mercator).

Hiring of Personnel: Y. Liu, T. Wakamatsu, and J. Zhu are working on this project. For details see project I.1.2 above.

Results Achieved to Date:

(1) The NEMO code has been implemented by E. Demirov for the North Atlantic Ocean at ¼ degree resolution in close collaboration with D. Wright from Dalhousie University. This model will be the basis of all of the assimilation development and testing to be carried out in projects I.1.2 and I.1.3 for the North Atlantic.

(2) Work on implementation of the SEEK data assimilation scheme has started under the supervision of E. Demirov and is planned for completion within the first year of the project.

(3) Observations for assimilation into the North Atlantic model have been collated by Y. Liu. The Argo data (vertical profiles of temperature and salinity) and along-track measurements of sea level by altimeters cover 1997-2006 and 1992-2006 respectively.

(4) Quality control (QC) of the Argo data was found necessary to supplement the QC flags provided with the Argo data (e.g., check for stations on land, unrealistic extreme values of temperature and salinity, compared to the new climatology of Igor Yashayaev DFO-BIO unrealistic vertical gradients). A scheme was developed to merge the along-track data from different satellites using the idea of a "super observation" for a given time and location. Lagrangian optimal interpolation was used to interpolate the Argo temperature and salinities to standard times.

(5) Simple optimal interpolation was used to make monthly mean maps of the Argo temperature and salinity data and the altimeter data for the North Atlantic. These fields will be used to remove bias in the assimilation schemes.

(6) Preliminary estimates of the observation and model error statistics, such as time and spatial decorrelation scales, have been estimated for temperature, salinity and sea surface height for the North Atlantic. These statistics will be used in the assimilation

method of Liu and Thompson that combines, in one step, the approaches of Cooper and Haines for the assimilation of altimeter data, and the method of DeMey for the assimilation of temperature and salinity data. The method also allows for the on-line estimation of the assimilation parameters.

(7) The new method has been successfully tested (cross validation), using Yashayaev's seasonal climatology as the background field. The method has been implemented in a 1/3 degree model of the North Atlantic based on the POP model. (This model was developed under a CFCAS project grant that immediately preceded the GOAPP Network grant.) Results are presently being evaluated using forecast skill of the model as the metric.

(8) Research Associate T. Wakamatsu has set up a North Pacific regional ocean model based on the NEMO ocean model package with the help of Y. Lu and Z. Wang from DFO-BIO. The model is now being tested on the IBM multi-processor computer at DFO's Institute of Ocean Sciences.

Project I.1.4 Ocean Reanalysis and Forecasting
Co-Investigators: D. Wright, E. Demirov, M. Foreman, M. Stacey

Specific Objectives: (i) Test the ability to hindcast and forecast variability in ocean conditions using the NEMO model with various forms of data assimilation, including those developed in I.1.1-3, (ii) Use embedded finer resolution sub-domains in a NA basin model to investigate the possibility of improving specific aspects of model results through improved resolution in critical regions, (iii) Investigate the causes of variability where good agreement with observations is found, (iv) Provision of a test-bed and conduit for model improvements into the global coupled system for Theme I and, ultimately, to the operational coupled system.

Schedule and Milestones:

Years 1-2 Implementation of global and basin-scale models. The global model will have a nominal horizontal resolution of 1 degree while the basin scale models will have nominal horizontal resolution of ¼ degree.

Hiring of Personnel:

Each investigator has hired support personnel. Wright has hired F. Dupont, Demirov has hired J. Zhu, M. Foreman has hired T. Wakamatsu and M. Stacey has hired Y. Shao. Together, these personnel provide expertise in ocean modelling, ocean data assimilation and high performance computing.

Progress to date:

1) The NEMO model has been implemented and tested on several different machines in the Atlantic region, at HPCVL in Kingston and on an IBM multi-processor computer at DFO-IOS, Patricia Bay. Matlab routines have been written to prepare model grids and data fields and these have been used to prepare 1 degree global and Arctic domains, and ¼ degree North Atlantic and North Pacific domains. These Matlab routines have been made available to other GOAPP investigators when requested.

2) The basic spectral nudging code has been implemented in NEMO and preliminary tests indicate that it is working as expected. Although this code requires further testing, it has been made available to all investigators with the caution that bugs may remain in it. Any bugs discovered will be reported to D. Wright and all users will be informed.

3) We are presently experimenting with 1 degree global and Arctic models and ¼ degree North Atlantic and North Pacific models, all including spectral nudging.

4) We have experimented with finer resolution sub-domains using AGRIF (Adaptive Grid Refinement in Fortran). Unfortunately older code worked well but bugs have apparently been introduced by the developers in newer versions. We hope that this will soon be resolved and are proceeding with tasks that don't require imbedded sub-domains for now. Other problems with reproducibility in the code have been identified and we have either corrected problems or developed "work-arounds" to deal with these.

5) The choice of model code and domains has been coordinated with other projects so that future transfers between groups will be as easy as possible.

6) We are preparing to initiate prognostic runs for the ECMWF reanalysis period using the 1 degree global model. We expect to complete both prognostic and spectrally nudged runs with 1 degree resolution and to begin analysis of these by January 2008.

Project I.1.5 Modelling and Assimilation of Sea Ice
Co-Investigators: P. Myers, E. Demirov

Specific Objectives: (i) Develop a version of the NEMO coupled sea-ice ocean model for the North Atlantic incorporating data assimilation (both on the ocean and sea ice components), (ii) Validate the data-assimilative coupled ice-ocean model against observed sea-ice measurements and existing models used operationally, (iii) Examine the representation of freshwater content and fluxes in a coupled sea-ice/ocean system with sea-ice assimilation.

Progress at University of Alberta: The NEMO model is now runs operationally on the WestGrid computer network. (See WestGrid definition in Appendix A.) A proposal for additional computer time on the WestGrid system has been submitted. Initial experiments with ocean data assimilation have been carried out. Additional experiments using spectral nudging of sea surface salinity towards climatology are ongoing.

Atmospheric forcing fields are presently being analyzed in order to generate ensembles that will be used to parameterize background error covariances for use in ice assimilation.

Progress at Memorial University of Newfoundland: Search for personnel started at the end of 2006. J. Zhu will take a Post Doc position on July 1, 2007. His PhD thesis defence is planned for the end of May. The NEMO code was implemented in close collaboration with D. Wright of Dalhousie University for the North Atlantic Ocean at ¼ degree resolution. The work on implementation of SEEK data assimilation scheme started with this code and is planned to be finished before the end of the first year of the project. This scheme will be tested in a sea-ice assimilation experiment during the second year of the project.

Sub-Theme I.2 Coupled Atmosphere-Ocean Modeling and Data Assimilation

Project I.2.1 Independent Assimilation into Coupled Models
Co-Investigators: P. Gauthier, H. Ritchie

Specific Objectives: (i) Initially to achieve improvements in both atmosphere and ocean forecasts when driven by "off-line" analyses produced by uncoupled data assimilation cycles of the other component (this will provide benchmarks for examining the details of coupling behavior), (ii) To further improve atmosphere and ocean forecasts when the component models are coupled together during assimilation cycles, but not within the analysis step, (iii) To provide coupled atmosphere-ocean fields from coupled atmosphere-ocean hindcast for sub-periods of 1993-2005, to be used in project I.2.2.

Initiation of the research has been delayed due to a long search to find an appropriate postdoctoral fellow for this project. A search committee consisting of H. Ritchie, K. Thompson, P. Gauthier and D. Wright was established. With the help of Network Manager, S. Woodbury, a joint position advertisement was prepared and publicized in November 2006. Applications were received and evaluated, a short list was prepared, and telephone interviews were conducted in early March 2007. Follow-on communications with some candidates are continuing.

Project I.2.2 Exploratory Studies on Joint Assimilation into Coupled Models
Co-Investigators: H. Ritchie, P. Gauthier

Specific Objectives: To conduct exploratory studies to examine the use of atmosphere-ocean cross-correlation functions during the analysis step, i.e., joint atmosphere-ocean data assimilation.

Through the candidates' review described for project I.2.1 above, F. Bakalian emerged as first choice for this project. F. Bakalian visited our team at Dalhousie University May 1-2 and presented a seminar on May 2. An offer was made on May 8 and accepted for a postdoctoral position starting on July 1 2007 or as soon as possible thereafter.

Related to the years 1-2 milestone "Conduct diagnostic evaluation of atmosphere-ocean cross correlations based on long CGCM coupled run from project II.1.1 (see below), collaborator W. Merryfield reports the following progress for the run that will be evaluated.

A 250-year control run based on the most recent version of a CGCM3 (T63, no flux adjustment, new ocean physics) is underway and should complete by the end of the reporting period. Merryfield is working with CCCma's AGCM group to reduce biases in CGCM4. A long CGCM4 control run will be undertaken when that work has reached a suitable stage.

W. Merryfield and GOAPP Research Associate W-S Lee have begun developing software tools for evaluating cross correlations in the CGCM.

Theme II: Seasons to Decades

Sub-Theme II.1 Analysis and Mechanisms

Project II.1.2 Pacific Decadal Oscillation and Northern Annular Mode
Co-Investigator: J. Fyfe, J. Derome, Wm. Merryfield

Specific Objectives: To understand and improve the representation of the dominant large-scale modes of tropical/extratropical variability in the CCCma coupled climate model (primarily), with a particular focus on the role these modes play in enhancing or limiting predictive skill at various time scales in the Northern Hemisphere.

Years 1-2 Milestones:
Data collection to include observations, CCCma coupled model control simulations and a multi-model ensemble of results from IPCC models contributing to the AR4.

Careful analysis and documentation of model behavior and errors in the simulation of mean climate and in the simulation of the key modes of Northern Hemisphere tropical/extratropical variability in the ensemble of model results, including the behavior of the "mean model".

PhD graduate student Fabian Lienart began his research and studies May 1, 2007. He is collecting and analyzing observations and a multi-model ensemble of results from the IPCC models contributing to the Fourth Assessment Report.

A 250-year present-day control simulation based on the latest version of CGCM3 is nearly complete. A comparable simulation based on CGCM4 will be undertaken pending work to reduce biases in that model version.

We have developed a compendium of ocean climatologies for 17 IPCC models, and have documented errors in the simulation of mean climate and modelled anthropogenically-driven changes for each model and the multi-model mean.

Sub-Theme II.2 Predictability of the Coupled System

Project II.2.1 Potential Predictability of Current and Future Climates
Co-Investigators: G. Boer, W. Merryfield

Specific Objectives: (i) Undertake a multi-model diagnosis of potential predictability of present-day climate using coupled climate model output (including that of CCCma CGCM3) submitted to IPCC Fourth Assessment, (ii) Extend the diagnostic study of potential predictability to include effect of climate change, (iii)Quantify regional influences on predictability in integrations in which ocean feedbacks are suppressed in key regions such as the tropical Pacific, the North Pacific, and the North Atlantic.

Schedule and Milestones:

Years 1 and 2: Collect data from IPCC data archive for multi-model potential predictability calculation for control and climate change simulations, transform to common grid, and perform multi-model potential predictability analysis.

Good initial progress has been made on this project. Data from 27 models in the IPCC data archive have been downloaded for control simulations and for two scenario simulations. Initial analysis has begun on the control simulation data which has been transformed to a common grid and analyzed for drift and variability. Multi-model potential predictability analyses are beginning for the control and some preliminary results will be presented at the GOAAP Workshop.

Project II.2.2. Prognostic predictability from ensembles of coupled model simulations
Co-Investigators: W. Merryfield, G.J. Boer, R. Greatbatch

Specific Objectives: (i) Obtain measures of prognostic predictability through "perfect model" predictability experiments based on large ensembles of coupled model integrations, (ii) Investigate influence of initial climate regime on seasonal-to-decadal predictability

Schedule and Milestones:

Year 1: Set up computational machinery for constructing and running large ensembles for "perfect model" experiments. Begin computing large ensemble of 10 year runs starting from neutral ocean initial conditions.

An initialization procedure has been developed for constructing ensembles for "perfect model" predictability experiments, and sensitivity to the magnitude of initial perturbations has been tested. Integration of the first few runs of the large ensemble has begun.

A post doctoral fellow who has experience in analyzing ensemble simulations and diagnosing predictability, A. Mohan R.S. of the Japan Agency for Marine-Earth Science and Technology, has been hired and will arrive in early August.

Sub-Theme II.3 Prediction

Project II.3.1 Coupled Model Initialization
Co-Investigators: G. Flato, W. Merryfield, R. Greatbatch

Specific Objectives: (i) Investigate and implement several relatively simple ocean initialization schemes in a global coupled model, (ii) Evaluate the relative merits of these methods in terms of the realism of initialization products, the severity of initial "coupling shock", and the skill of bias-corrected coupled forecasts, (iii) Having established the fidelity of the methods and optimized them, to use them as a basis for generating an ensemble of initial conditions for the CHFP.

Schedule and Milestones:

Year 1: Continue nudging experiments and test forecasts, following on from CliVar activity. Begin assembling 3-D data sets and initiate collaborative work on 2D-Var and semi-prognostic methods.

Nudging experiments based on an initial CGCM3 configuration which is serving as a development platform were continued. An initial ensemble generation procedure was finalized and a full set of 10-member ensemble forecasts has been obtained for August, November and February initializations over 1972-2001.

Nudging initialization has begun using a newer CGCM3 version (the main differences are in the ocean vertical resolution and physical parameterizations). Sensitivity to nudging time scale and methodology has been examined in these experiments.

Collaborative work on 2D-Var has begun, building on the expertise of Y. Tang. Samples of several different 3-D ocean reanalyses, which will serve as input for data assimilation (using 2D-Var and the semi-prognostic method) have been imported and are being evaluated.

Project II.3.2 The Coupled Model Historical Forecasting Project
Co-Investigators: G. Boer, J. Derome, W. Merryfield, G. Flato and R. Greatbatch

Specific Objectives: (i) Produce a sequence of retrospective multi-seasonal ensemble forecasts using the CCCma coupled atmosphere-ocean-land-ice model and to extend a subset of these forecasts to the decadal range, (ii) Investigate methods of generating ensembles of initial conditions and of forecasts, possibly including multi-analysis and multi-model approaches, (iii) Obtain basic skill measures of multi-seasonal forecasts produced in this way and some insight into the possible utility of predictions at longer times, (iv) Analyse and identify, to the extent possible, those aspects of the forecast system that impact on predictive skill.

Schedule and Milestones:

Years 1 and 2: Initial forecast experiments to assess and refine the CHFP approach to be adopted including ensemble generation, data assimilation, forecast production and initial verification methods.

Reasonable progress is being made on the CHFP as an extension of the studies undertaken in the CLIVAR Network. B. Pal has been funded locally for 3 months to continue to produce historical coupled forecasts for analysis. W-S Lee, a well qualified Research Associate from Korea with experience in coupled forecasting, arrived April 1 and has already becoming familiar with the model and has produced some diagnostic codes for the analysis of seasonal forecasts.

Project II.3.3 Forecast Combination, Calibration and Verification
Co-Investigators: Jacques Derome, G. Boer and W. Hsieh

Specific Objectives: (i) Comprehensive and sophisticated analysis of the skill of CHFP forecasts at time scales of interest including the geographical distribution of skill and the connection to known dynamical modes, (ii) Development of sophisticated post-processing methods to improve skill of global coupled model forecasts including the development of probability forecasts and their calibration in single- and multi-model ensemble settings, (iii) Assessment of potential economic value in a cost-lost decision framework.

This project is running a little ahead of schedule. Milestones were provided starting with year 2 only, but some work has started in year 1. S. Kharin and A. Shabbar have started to use multi-century simulations to determine the predictive skill of Canonical Correlation Analysis (CCA) forecasts. H. Lin, J. Derome and G. Brunet have looked at the statistical post-processing of dynamical seasonal precipitation forecasts made as part of the CLIVAR Historical Forecasting Project. A report on this latter work was presented at the GOAPP workshop.

1.2 EXPLAIN ANY SIGNIFICANT DELAYS OR DEPARTURES FROM THE RESEARCH PLAN, OR THE RESCHEDULING OF ACTIVITIES, AND HOW THEY WERE ADDRESSED.

Most of the projects report they are on schedule (I.1.1, I.1.2, I.1.3, I.1.5, II.1.2, and II.3.1) and one project (II.3.3) is ahead of schedule.

Project I.1.4 reports difficulties with the hiring of personnel. However, coordination of activities with DFO personnel has resulted in the project being only slightly behind schedule. With the arrival of new CFCAS/GOAPP personnel and continued coordination of activities the project is expected to be on schedule by this time next year.

Projects I.2.1 and I.2.2 have been delayed due to a long search to find appropriate postdoctoral fellows. The new PDF for 1.2.2 will start work in July 2007.

Project II.2.2 reports that the arrival of Post Doctoral Fellow A. Mohan R.S. has been delayed from April until early August.

Project II.3.2 reports it took longer than desired to recruit personnel. W-S Lee joined the project as of 1 April.

1.3 EXPLAIN SIGNIFICANT DEVIATIONS FROM THE BUDGET. (NOTE: CHANGES OF 20% OR MORE FROM BUDGET CATEGORIES REQUIRE ADVANCE APPROVAL FROM THE CFCAS SECRETARIAT).

The SSC approved the following minor deviations in the budget.

Project I.1.1 Difficulties finding appropriate personnel have resulted in a late start for the funded part of this project. The SSC has agree to allow D. Wright to use the accumulated funds to cover the incremental cost in year one of hiring a Research Associate rather than a Post Doc and to allow both D. Wright and E. Demirov to hire additional support staff to accelerate progress. Total expenditures by the end of July, 2008 will be as initially expected.

Project I.1.2 and I.1.3 The search for an appropriate postdoctoral candidate to work with E. Demirov at Memorial University took longer time than expected. This resulted in a late start for the funded part of the project. The SSC agreed to allow E. Demirov to use the accumulated funds to support a graduate student.

Project I.1.4 Expenses have been primarily associated with advertising for personnel and paying their salaries. There have been no significant deviations other than the late start of two support personnel. Accumulated funds due to this delay will be used to support additional personnel to accelerate progress this summer. Total expenditures will be as expected by July 2008.

Project I.1.5 The search for the Post Doc for Memorial took longer time than expected. This resulted in a late start for the funded part of this project. The SSC approved the use of accumulated funds to support a graduate student. Our total expenditures will be as expected by the end of July 2008.

1.4 DESCRIBE HOW THE WORK OF CO-INVESTIGATORS WAS INTEGRATED OR COORDINATED.

At the Network level, six Co-Investigators are members of the Scientific Steering Committee (SSC). The SSC acts as an important integrating mechanism among projects and between the two Themes. In addition, the GOAPP Workshop, held on May 28, 2007, gave the Network participants an excellent opportunity to report on their progress and to interact.

Some specific examples of collaboration within Themes include the following:

1. Choice of ocean models and their configuration, e.g., development of common NEMO model set-up for the North Atlantic. Information is being shared on the GOAPP web site (www.goapp.ca) through the NEMO Users Forum.

2. Sharing of code (e.g., spectral nudging).

3. Sharing personnel and visits, for example, Research Associate T. Wakamatsu visited Halifax (Dalhousie University and DFO-BIO), St. John's (Memorial University) and Kingston (Royal Military College) in March and D. Wright visited Royal Military College later in March to accelerate technology transfer.

1.5 DESCRIBE THE PARTICIPATION OF GOVERNMENT (FEDERAL, PROVINCIAL OR MUNICIPAL), UNIVERSITY, INDUSTRY, FOREIGN OR PRIVATE SECTOR RESEARCHERS (AND/OR OTHER STAFF) INVOLVED IN THE PROJECT.

The participation of government researchers in the project has been excellent. This is in part due to the fact that eight of the Co-Investigators are adjunct professors. In addition, other government people have been involved, such as, S. Lambert, CCCma's data person, who has contributed by downloading and reformatting much of the IPCC data. Additional government collaborators include S. Kharin, A. Shabbar, H. Lin and G. Brunet of Environment Canada.

Some GOAPP researchers are partially funded by government. For example, T. Wakamatsu receives 50% of his salary from DFO and works part time at DFO-IOS. Also, model support has been provided by the DRAKKAR and MERCATOR groups in France.

IMPACT

1.6 WHAT SHORT AND MEDIUM TERM OBJECTIVES HAVE BEEN ACHIEVED, OR ARE ANTICIPATED;

It is too early to report on this aspect with any certainty. However, individual projects have made significant progress as detailed above. Also, several papers are already in publication and several modelling systems have been implemented.

1.7 DESCRIBE THE SIGNIFICANCE / IMPACT OF THE RESULTS ACHIEVED TO DATE AND HOW THIS NEW KNOWLEDGE HAS INFLUENCED RESEARCH POLICY, ENHANCED RESEARCH COLLABORATION OR COMPETITIVENESS, OR HELPED ATTRACT OR TRAIN SKILLED PERSONNEL.

Address the following items, as appropriate:

- **The impact of the project on government policy development (federal, provincial or municipal);**

  Given that the Network has been underway for less than one year, there has not been enough time for it to have a significant impact on government policy. We note, however, that the Network complements an interagency initiative to develop an operational ocean modelling and coupled ocean-atmosphere-sea ice capability in Canada (CONCEPTS).

- **How the project has expanded contacts in partner organizations, or increased cross-disciplinary cooperation;**

  As mentioned above, the Network is part of CONCEPTS and has thus increased cross disciplinary and interdepartmental cooperation.

- **Whether and how it has improved the reliability of predictive methods;**

  It is too early to answer this question.

- **The impact of the project on your own institution;**

  The Network has increased the number of highly qualified personnel in all of the partner institutions. At Dalhousie University, the home of the Network Secretariat, the GOAPP initiative has been positively received by the senior administration and they look forward to the official launch of the Network to raise the profile of ocean and atmospheric research in Canada.

- **Whether and how the project has helped increase funding from other agencies, or led to new partnerships;**

Not applicable.

- **Any current (or potential) commercial or social applications, which the results may have;**

  It is too early to answer this question.

- **Links with international initiatives and the potential impact of these;**

  Coordination of activities with the Mercator operational center in Toulouse, France and the European DRAKKAR Research and Development group is underway. Prospects are promising. Coordinated activities on common interests will help to ensure the success of this project, including the advancement of operational oceanography in Canada. In addition our work on the CHFP ties in with the Task Force on Seasonal Prediction (TFSP) part of the World Climate Research Programme (WCRP) strategic framework for Coordinated Observation and Prediction of the Earth System (COPES).

- **Anticipated benefits of the work for Canadians.**

The research of the Network is just starting and, therefore, it is too early to list, at this time, specific benefits of the work for Canadians. However we note that the Network's research will be of direct benefit to Canada. Improved knowledge of the state of the atmosphere and ocean from global coupled models and data assimilation systems is a critical need for science and for several government departments (including EC, DFO and DND). Improved predictions on time-scales from days to decades can have both immediate and long-term societal benefits, despite the difficulty in their production and, in some cases, modest skill. The Network will also make important contributions to the development of research capacity and the training of personnel in coupled atmosphere-ocean forecasting. This is essential if Canada is to remain internationally competitive in this field and also have the capability of making the best possible forecasts in response to national needs.

2 LEVEL OF SUPPORT

2.1 WHAT PROPORTION OF THE TOTAL BUDGET WAS PROVIDED BY CFCAS?

Almost all of the budget is for personnel. In the vast majority of cases funded personnel are totally supported by GOAPP. As mentioned above, Wakamatsu is co-funded by GOAPP and DFO. Also several investigators are using GOAPP funds to partially support graduate students. For example, the undergraduate student Khoa Nguyen was subsidized to 50% of his funding by the International Office at the University of Alberta for the period October, 2006 to March, 2007.

2.2 DESCRIBE ANY ADDITIONAL OR 'MATCHING' RESOURCES THAT WERE SECURED OR COMMITTED TO THE PROJECT: SOURCES AND AMOUNTS, AND WHETHER THEY WERE FURNISHED AS AGREED (ON SCHEDULE AND IN THE AMOUNTS AGREED).

There were no matching funds.

2.3 DESCRIBE IN-KIND CONTRIBUTIONS RECEIVED FROM COLLABORATORS OR SPONSORS AND, IF POSSIBLE, THEIR ESTIMATED VALUE (E.G. EXPERTISE OF FEDERAL OR OTHER SCIENTISTS, FACILITIES, TECHNICAL SUPPORT, ETC.).

Secretariat: DFO and Dalhousie University have contributed to the running of the Network Secretariat (e.g., phone charges, furniture).

Computer Resources: A major contribution in kind has been computer resources provided by government partners. Without these resources it would be impossible to undertake the Network's research. Equally important has been the computer resources made available to us by the ACEnet, HPCVL and WestGrid consortiums. The annual fee ($5000.00) for access to HPCVL is provided by another research grant obtained through Royal Military College. All institutes are providing basic facilities, including personal computers, for both PIs and support personnel at no extra cost. Also note that significant computer resources have been purchased by E. Demirov with funds supplied by the Canadian Foundation for Innovation.

Model Development: Much of the Theme II research is based on the most recent version of CCCma's CGCM3 coupled climate model (T63, no flux adjustment, new ocean physics). The time of numerous CCCma researchers contributing to the development and the computing resources in Victoria and Dorval are paid for by Environment Canada. Similarly, a significant part of the NEMO model implementation has been carried out by DFO researchers (under COMDA).

Support by Government Researchers: Both Environment and Fisheries and Oceans Canada have allowed some of their most experienced and effective researchers to contribute directly to GOAPP research. For example, DFO has contributed a significant amount of time of D. Wright, M. Foreman, and Youyu Lu. Similarly, Environment Canada personnel (H. Ritchie, P. Gauthier, P. Pellerin, S. Bélair, G. Boer, W. Merryfield, J. Fyfe, S. Kharin, G. Flato and J. Scinocca) have been extensively involved in the GOAPP Network.

2.4 DESCRIBE TRANSFER OF FUNDS TO CO-INVESTIGATORS: TO WHOM AND WHERE? HOW DID THE CO-INVESTIGATOR(S) REPORT ON THE FUNDS USED; AND WERE INTER-INSTITUTIONAL AGREEMENTS USED.

Funds were transferred from Dalhousie University to the Co-Investigators on a three monthly basis. Dalhousie required each participating university to sign a letter of agreement prior to releasing the funds to the institution. The amount of funds transferred was in accordance with the request of the Co-Investigator for the specific time period.

The list of Co-Investigators and their affiliation can be found in Appendix B. Only R. Greatbatch, J. Fyfe and W. Hsieh did not request funds during this reporting period.

2.5 INDICATE ANY OUTSIDE FACILITIES USED DURING THE PROJECT (E.G. METEOROLOGICAL INSTRUMENTS, RESEARCH LABORATORIES, SHIP TIME, ETC.) AND DESCRIBE THE ARRANGEMENT.

The only outside facilities used over the last year relate to computer resources. For example, M. Foreman has accessed the DFO-IOS mini-super computer. Several researchers have used the academic computing networks, e.g., Myers (WestGrid), Stacey (HPCVL), Thompson, Wright, Demirov (ACEnet). As noted above, significant computer resources have been provided by Environment Canada through Dorval and Victoria-based computer facilities.

3 DISSEMINATION

3.1 PROVIDE INFORMATION ON DISSEMINATION OF THE RESEARCH RESULTS (PUBLICATIONS, INCLUDING JOURNAL NAMES AND WHETHER REFEREED), CONFERENCE CONTRIBUTIONS, SEMINARS, WORKSHOPS OR VIDEOS, WEBSITES OR OTHER METHODS OF TRANSFERRING THE RESULTS.

Early to expect many publications at this point. Most projects just started. A number of invited talks have been given. For example:

- M. Foreman gave an invited presentation entitled “Mean Sea Surface Topography for the Northeast Pacific Ocean and Its Continental Shelves” at the Canadian Meteorological and Oceanographic Society annual meeting on June 1.

- D. Wright collaborated with F. Davidson to give the CMOS lecture tour talk entitled “Ocean Prediction for Canadians” at more than 20 locations across Canada. The need for improved ocean prediction and the role of the GOAPP project were both thoroughly addressed in these talks.

- Preliminary GOAPP research and development results were included in the following presentations by H. Ritchie:

    - H. Ritchie, D. Bancroft, A. Cameron, G. Flato, J. Loder, K. Thompson, and D. Wright “Initiating an Operational Canadian Global Assimilation and Prediction Capability for the Coupled Atmosphere-Ocean-Ice System”, 87th American

Meteorological Society Annual Meeting, San Antonio, TX, 14-18 January, 2007, program p. 72 and on CD.

- A similar presentation (with N. Scantland replacing A. Cameron) was included as a poster in the CMOS Congress in St. John's, NL, May 31, 2007.

- A list of presentations given at the GOAPP Workshop on May 28, 2007 can be found in Appendix C.

- G. Boer presented some early CHFP related results to the WMO/WGSIP Seasonal Prediction Workshop in Barcelona in June.

- P. Myers gave a talk titled "Plans for Sea-Ice Modelling and Assimilation as part of GOAPP using the NATL4 Configuration of NEMO" at the International Ice Chart Working Group workshop on Sea Ice Assimilation in Oslo, May 14-17.

- The following talks were presented by S. Rattan at the CMOS Congress:

  - Sanjay Rattan, Paul Myers, Impact of the parameterization of unresolved eddies in an eddy-permitting model of the North Atlantic using NEMO

  - Sanjay Rattan, Paul Myers, Impact of the parameterization of unresolved oceanic eddies on the representation of sea-ice in an eddy permitting model of the North Atlantic using NEMO.

3.2 DESCRIBE DATA MANAGEMENT/SHARING ACTIVITIES INCLUDING ORGANIZATION OF THE METADATA. ALSO IS THE DATA BEING ARCHIVED, AND HOW WILL IT BE MADE AVAILABLE TO OTHER RESEARCHERS?

In response to the comments of the external reviewers of the GOAPP proposal, and CFCAS, GOAPP has established a Data Management Committee to: (i) develop a Data Management Policy for the Network, (ii) develop an operational plan and (iii) deal with all data management issues related to GOAPP as they arise.

The GOAPP Data Management Committee (DMC) consists of: J. Chaffey (DFO), W. Merryfield (GOAPP Co-Investigator), M. Ouellet (DFO), H. Ritchie (GOAPP PI), K. Thompson (GOAPP PI), Lt. (N) D. Williams (DND) and S. Woodbury (GOAPP Network Manager)

The Data Management Policy has been submitted as a separate document with this report.

3.3 COMMENT ON ANY OUTREACH OR PUBLIC INFORMATION ACTIVITIES, INCLUDING PRESS INTERVIEWS OR OTHER MEDIA INTEREST OR REPORTS. HAS THE PROJECT HELPED TO POPULARIZE SCIENCE OR INCREASE PUBLIC AWARENESS?

It is too early for outreach activities. We anticipate the official launch of the Network will be held in September 2007 at Dalhousie University in Halifax. Media information kits, press releases, backgrounders, etc. will be prepared by GOAPP, Dalhousie University and CFCAS. Invitees will come from a broad cross section of disciplines – politicians, scientists, private industry, university and government.

4.4 HOW HAVE YOU ACKNOWLEDGED SUPPORT FROM CFCAS?

GOAPP authors have acknowledged CFCAS in all publications and presentations. CFCAS is acknowledged on the GOAPP web page at www.goapp.ca.

4.5 ATTACH COPIES OF ANY PAPERS PUBLISHED OR ACCEPTED FOR PUBLICATION.

It is too early for this.

4 TRAINING

4.1 QUANTIFY STUDENT AND POSTDOCTORAL INVOLVEMENT IN THE PROJECT, INDICATING THE NUMBER OF: UNDERGRADUATE, MASTERS, DOCTORAL OR PDFS. ALSO SUMMARIZE THEIR ROLES IN THE PROJECT.

Undergraduate Student: 1

K. Nguyen (Myers) – Project I.1.5. He has been working part-time during the term (and hopefully full-time during the summer) to assist with data analysis and model-data comparisons.

Masters Student: 2

ZY Wang (Tang) – Project I.2.2. His duty includes (1) to examine and extend the SST assimilation method that proposed by Tang to the middle-high latitude; (2) to run joint-assimilation experiments of coupled model if necessary.

M. Dunphy (Wright) – Project I.1.4. He was supported as a co-op student as part of the DFO contribution to GOAPP. He has now finished his undergraduate degree and we have now hired him as a consultant to continue working on related activities. He has been heavily involved in model development and technology transfers to other groups. He will begin a master's degree at Waterloo this fall and plans to continue to work with GOAPP during summer breaks if time permits.

PhD Students: 5

F. Lienart (Fyfe) – Project II.1.2. F. Lienart came from ETH Zurich in May 2007. He is collecting and analyzing observations and a multi-model ensemble of results from the IPCC models contributing to the Fourth Assessment Report.

S. Rattan (Myers) – Project I.1.5. He is funded by an NSERC grant and so does not receive GOAPP funds (other than for travel to our meeting at CMOS). He is in the third year of his PhD (he started work under CLIVAR funding). He has helped with getting the NEMO ocean/sea-ice model operational at the University of Alberta and with performing basic experiments using ocean assimilation. He is analyzing them as well as the impact of Irminger Water on Labrador Sea water. He will also look at the how the model represents sea-ice (in prognostic mode) in Canadian waters.

M. Turnbull (Myers) – Project I.1.5. M. Turnbull started her PhD in September 2006 and has just finished courses and is so just starting on her research. She will be working on the sea-ice assimilation part of the project, beginning by studying the background model error covariances.

New student (Tang) – Project I.2.2. Expected start date September 2007. This student will be partially supported by the Network (1/3). Duties will be determined.

New student (PhD) (Flato) – Project II.3.1. Expected start date September 2007. He/she will be working on analysis of coupled system seasonal forecasts, comparing results from different, simple methods for data assimilation.

Post Doctoral Fellows: 5

F. Bakalian (Ritchie) – Project I.2.2. He will be working on "Exploratory Studies on Joint Assimilation into Coupled Models" starting July 2007.

Y. Liu (Thompson) – Projects I.1.2 and I.1.3. He is expanding his expertise in data assimilation while working on the projects.

A. Mohan R. S. (Merryfield) – Project II.2.2. He will arrive in late July or early August 2007 and will work on coupled model predictability studies.

T. Wakamatsu (Foreman) – Projects I.1.2, I.1.3, I.1.4. He is an expert in data assimilation.

J. Zhu (Demirov) – Projects I.1.3. He will assess the skills of the data assimilation schemes which will be developed in Project I.1.3.

See Appendix B for a diagram which depicts the distribution of people in the GOAPP project and a photo of the participants in the GOAPP Workshop.

Research Associates: 4

F. Dupont (Wright) – Project I.1.4. He has a strong background in ocean modelling and an interest in learning about data assimilation;

W-S Lee (Boer) – Project II.3.2. A well-qualified Research Associate from Korea with experience in coupled forecasting, she has become familiar with the model and has produced some diagnostic codes for the analysis of seasonal forecasts. She has begun developing software tools for evaluating cross correlations in the CGCM.

Y. Shao (Stacey) – Project I.1.4. He is an expert in computational physics, and will be doing most of the simulations involving NEMO. He will be heavily involved in model development.

Z. Wang (Wright) – Project I.1.4. He is a research associate within the Center for Marine Environmental Prediction at Dalhousie University. He has been spending more than 50% of his time on GOAPP related work over the past year and has become the local expert on the NEMO code used in this project. He will continue to spend significant time on the GOAPP project if funds continue to be available.

See Appendix B for a diagram which shows the distribution of GOAPP participants.

5 OTHER

5.1 HOW COULD CFCAS ENHANCE ITS SUPPORT FOR UNIVERSITY-BASED RESEARCH IN CLIMATE AND ATMOSPHERIC SCIENCES, OR OTHERWISE ASSIST THE COMMUNITY? PROVIDE ANY REMARKS OR ADDITIONAL SUGGESTIONS FOR CFCAS.

The Network is appreciative of the efforts of the CFCAS staff. More extensive comments will be provided in next year's report.

Appendix A
Acronyms and Abbreviations

Acronym or Abbreviation	Explanation
ACEnet	Atlantic Computational Excellence Network. ACEnet is Atlantic Canada's entry into this national fabric of high-performance computing facilities.
AGCM	Atmospheric General Circulation Model
BIO	Bedford Institute of Oceanography
CCCma	Canadian Centre for Climate Modelling and Analysis
CGCM3 and CGCM4	Coupled Global Climate Model
CHFP	Coupled Historical Forecast Project
COMDA	Center of Ocean Model Development and Analysis
CONCEPTS	Coupled Environmental PredicTion Systems
DFO	Fisheries and Oceans Canada
DRAKKAR	Multi-scale Ocean Modelling Project http://www.ifremer.fr/lpo/drakkar/index.htm
ECMWF	European Centre for Medium-Range Weather Forecasts
GEOIDE	GEOIDE's mission is to consolidate and strengthen the domestic geomatics industry, while making optimum use of Canada's Research and Development resources and to create a sustainable networking structure integrating all sectors of the Canadian geomatics community.
GOAPP	Global Ocean-Atmosphere Prediction and Predictability
HPCVL	High Performance Computing Virtual Laboratory
IPCC	Intergovernmental Panel on Climate Change
MSST	Mean Sea Surface Topography
NEMO	Nucleus for European Modelling of the Ocean http://www.lodyc.jussieu.fr/NEMO/
NSERC	Natural Science and Engineering Research Council of Canada
PDF	Post Doctoral Fellow
SEEK filter	Singular Evolutive Extended Kalman filter
WestGrid	WestGrid is a collaborative project providing high-performance computing and multimedia/visualization resources to researchers and educators across Western Canada.
WMO/WGSIP	World Meteorological Organization/ Working Group on Seasonal to Interannual Prediction

Appendix B – Lists and Diagrams

Co-Investigators

Name	Affiliation
G. Boer	University of Victoria
E. Demirov	Memorial University
J. Derome	McGill University
G. Flato	University of Victoria
J. Fyfe	University of Victoria
P. Gauthier	Université du Québec à Montréal
R. Greatbatch	Dalhousie University
W. Merryfield	University of Victoria
P. Meyers	University of Alberta
M. Foreman	University of Victoria
H. Ritchie	Dalhousie University
M. Stacey	Royal Military College
Y. Tang	University of Northern British Columbia
K. Thompson	Dalhousie University
W. Hsieh	University of British Columbia
D. Wright	Dalhousie University

Scientific Steering Committee

Co-Investigators	Affiliation
G. Boer	University of Victoria
J. Derome	McGill University
G. Flato	University of Victoria
H. Ritchie	Dalhousie University
K. Thompson	Dalhousie University
S. Woodbury (ex-officio)	Dalhousie University
D. Wright	Dalhousie University

Appendix B

GOAPP Collaborators

Name	Affiliation
B. Archambault	Environment Canada
S. Bélair	Environment Canada
M. Buehner	Environment Canada
G. Brunet	Environment Canada
T. Carrieres	Environment Canada
S. Kharin	Environment Canada
H. Lin	Environment Canada
Y. Lu	Fisheries and Oceans Canada
A. Monahan	University of Victoria
T. Murdock	Pacific Climate Impact Consortium, University of Victoria
P. Pellerin	Environment Canada
F. Saucier	Université du Québec à Rimouski
J. Scinocca	Environment Canada
A. Shabbar	Environment Canada
A-M Treguier	Laboratoire de Physique des Océans, Brest, France
M-F Turcotte	Environment Canada
I. Yashayaev	Fisheries and Oceans Canada
B. Yu	Environment Canada

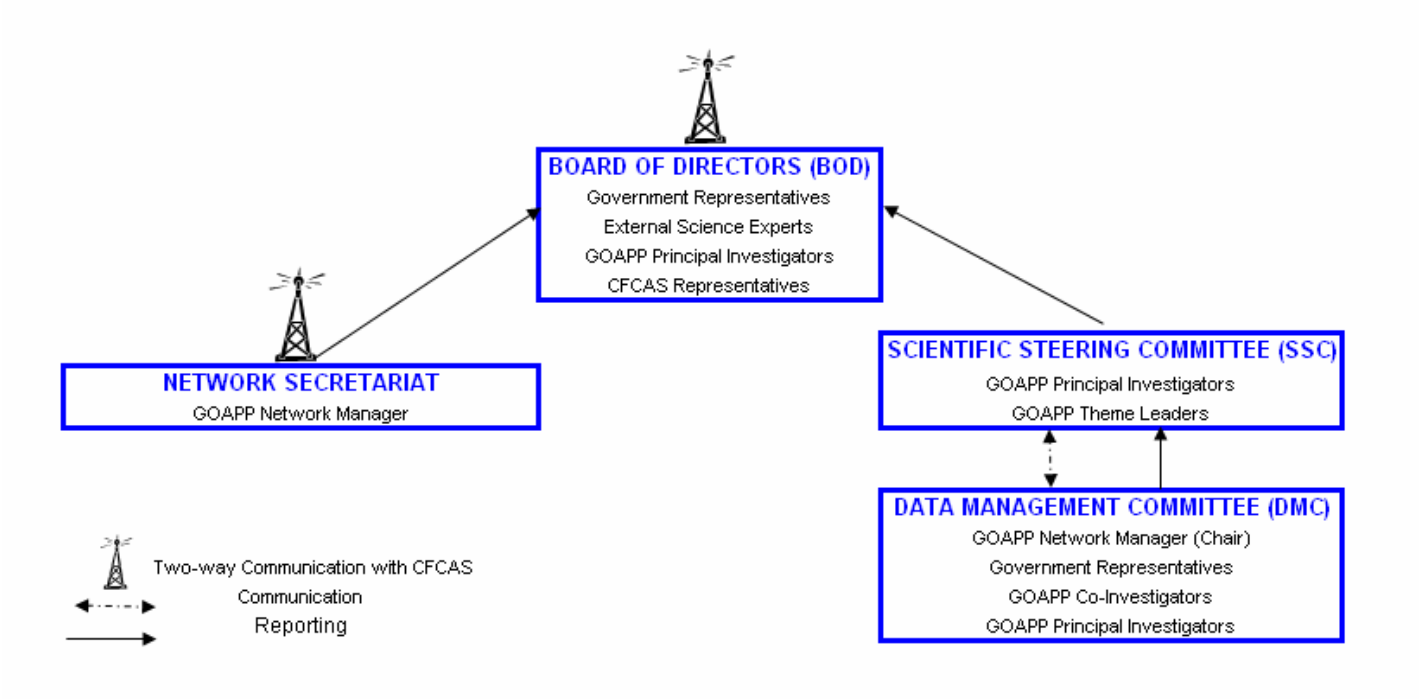
Appendix B

Board of Directors

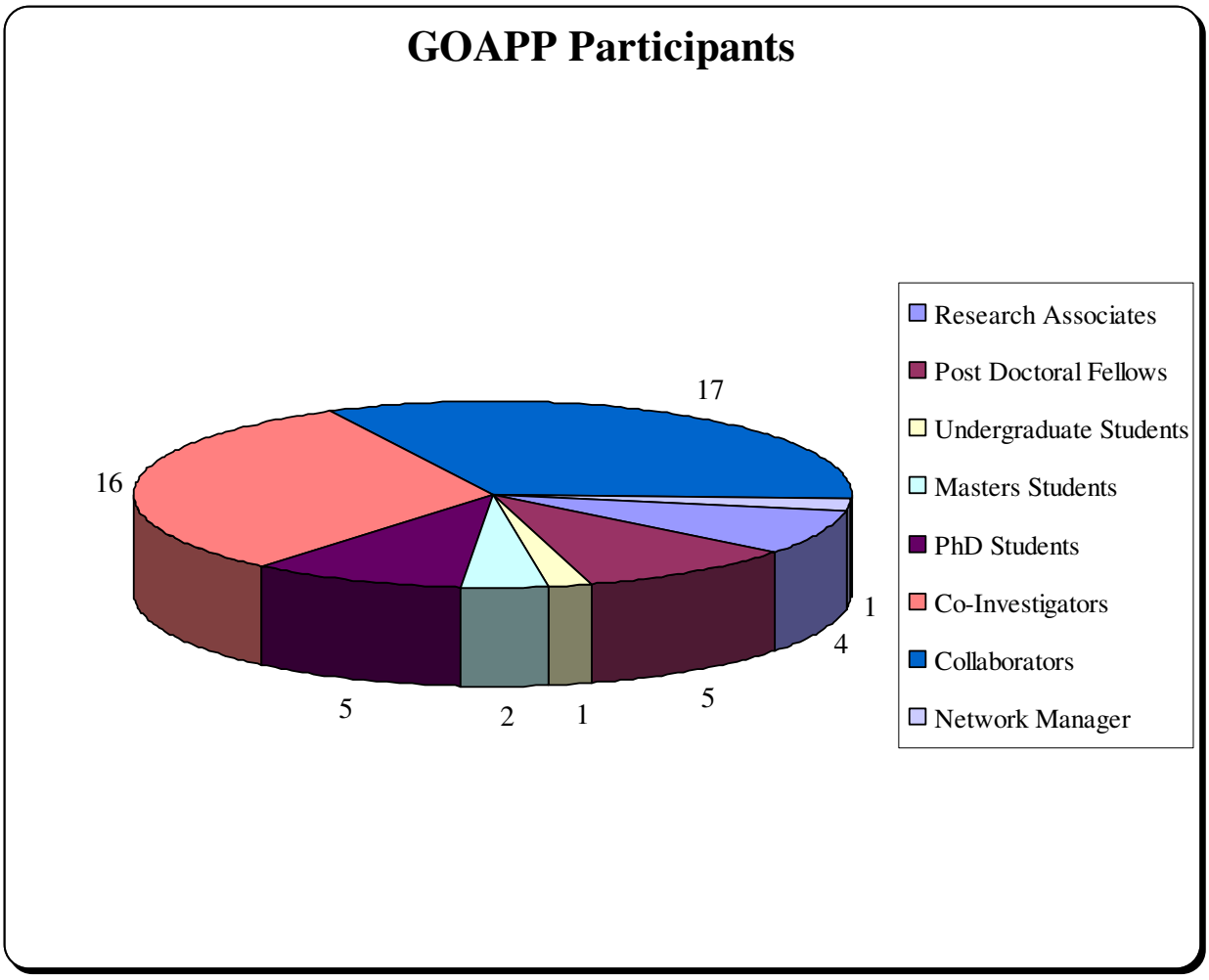
Name	Affiliation
M. Anderson	Department of National Defence
T. Aston (ex-officio)	Canadian Foundation for Climate and Atmospheric Sciences
A. Clarke	Fisheries and Oceans Canada
E. Dombrowsky	MERCATOR OCEAN
B. Kirtman	GMU/COLA
C. Lin	Environment Canada
S. Narayanan	Fisheries and Oceans Canada
H. Ritchie	Dalhousie University
K. Thompson	Dalhousie University
E. Wilson (ex-officio)	Canadian Foundation for Climate and Atmospheric Sciences
S. Woodbury (ex-officio)	Dalhousie University

APPENDIX B

GOAPP Management Structure



Appendix B


GOAPP Participants
17
16
1
4
5
2
1
5
Research Associates
Post Doctoral Fellows
Undergraduate Students
Masters Students
PhD Students
Co-Investigators
Collaborators
Network Manager

Appendix B

GOAPP Workshop May 28, 2007

Back Row: Yimin Lui, Tim Aston, Mike Foreman, Hal Ritchie, Dan Wright, Jacques Derome, Allyn Clarke, Xiaobing Zhou

Front Row: Bill Merryfield, Youyu Lu, Woo-Sung Lee, Greg Flato, Entcho Demirov, George Boer, Keith Thompson, Youmin Tang

Missing: Dawn Conway, Paul Myers, Sanjay Rattan, Erica Wilson, Susan Woodbury

Appendix C

GOAPP Network Workshop

Monday, May 28, 2007
Delta Hotel – Brownsdale Room
St. John's, NL
AGENDA

0845	1. Welcome and Introduction	Hal Ritchie, Susan Woodbury & CFCAS Rep
0855	2. Plan for the workshop	Hal Ritchie
0900	3. Theme I overview	Keith Thompson
0915	4. Theme II overview	Greg Flato
0930	5. Initiating an Operational Canadian Global Assimilation and Prediction Capability for the Coupled Atmosphere-Ocean-Ice System	Hal Ritchie
0945	6. DFO/COMDA developments in preparation for GOAPP: Who's doing what?	Dan Wright
1000	7. UVic/DFO progress on the west coast: Who is doing what?	Mike Foreman
1015	**Refreshment Break**	
1030	8. Decadal Potential Predictability.	George Boer
1045	9. Post-processing of dynamical seasonal precipitation forecasts?	Jacques Derome
1100	10. Ocean Multivariate Data Assimilation in GOAPP.	Entcho Demirov
1115	11. Progress in Ocean Data Assimilation at Dalhousie	Yimin Liu
1130	12. Ensemble Kalman Filter for SST Assimilation	Youmin Tang
1145	13. Plans for Coupled Atmosphere-Ocean Data Assimilation in GOAPP	Hal Ritchie
1200	**Lunch (Provided by GOAPP)**	
1250	14. Woo-Sung Lee: An Introduction.	Woo-Sung Lee
1300	15. Coupled Seasonal Forecasting at CCCma	Bill Merryfield
1315	16. Sea-ice Forecasting: Prospects and Plans	Greg Flato
1330	17. GOAPP at the University of Alberta: Plans and Preliminary Work	Paul Myers and/or Sanjay Rattan

1345	18. Interactions between Themes and amongst projects. Coordination of research	Keith Thompson
1415	19. Discussion of Scientific Issues arising from the Presentation	Keith Thompson
1500	**Refreshment Break**	
1530	20. GOAPP Data Management Policy	Susan Woodbury
1545	21. GOAPP web page and the Opa Users Forum	Susan Woodbury and Youyu Lu
1600	22. GOAPP Annual Report – Timing and approval	Susan Woodbury
1630	23. Other Network business (e.g., Official Launch of the Network)	Keith Thompson
1645	24. Plans for next meetings	Hal Ritchie
1650	25. Review of Action Items	Susan Woodbury

List of Supporting Documents

- Data Management Policy
- Milestones for Themes I and II
- Draft Annual Report

Next SSC Meeting: June _____, 2007

Next BOD Meeting: June 21, 2007

Next Workshop at the CMOS Congress, Kelowna, BC May 2008