Project no. GOCE-CT-2003-505539

Project acronym: ENSEMBLES

Project title: ENSEMBLE-based Predictions of Climate Changes and their Impacts

Instrument: Integrated Project

Thematic Priority: Global Change and Ecosystems

Milestone M1.7

A workshop organized jointly with WGSIP (the CLIVAR Working Group on Seasonal to Interannual Prediction) will be held in Barcelona on 4-8 June 2007 to gather scientists working on seasonal-to-decadal forecasting from different continents

Due date of deliverable: month 36
Actual submission date: 25 July 2007

Start date of project: 1 September 2004 Duration: 60 Months

Organisation name of lead contractor for this deliverable: ECMWF

Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006)		
Dissemination Level		
PU	Public	PU
PP	Restricted to other programme participants (including the Commission Services)	
RE	Restricted to a group specified by the consortium (including the Commission Services)	
CO	Confidential, only for members of the Consortium (including the Commission Services)	

ENSEMBLES

Milestone M1.7

Authors: Antje Weisheimer, Francisco J. Doblas-Reyes (ECMWF)

Due: month 36

A workshop organized jointly with WGSIP (the CLIVAR Working Group on Seasonal to Interannual Prediction) will be held in Barcelona on 4-8 June 2007 to gather scientists working on seasonal-to-decadal forecasting from different continents

1. Introduction

The World Climate Research Program (WCRP) Task Force on Seasonal Prediction (TFSP) in collaboration with the International CLIVAR Working Group on Seasonal to Interannual Prediction (WGSIP) held the first Workshop on Seasonal Prediction on June 4-7 2007 in Barcelona. The Workshop was co-funded and hosted by the Servei Meteorològic de Catalunya at the Barcelona World Trade Centre. The WCRP Workshop on Seasonal Prediction was directly followed by an ENSEMBLES Project Meeting on seasonal and interannual predictions (7-8 June 2007).

The first part of this report gives a brief summary of the WCRP Workshop, and the second part discusses the ENSEMBLES meeting on seasonal and interannual predictions. A brief summary of a WGSIP meeting, held in parallel with the ENSEMBLES meeting, is also given.

2. WCRP Workshop on Seasonal Prediction

The main objective of the WCRP Workshop was to enable the WCRP Task Force on Seasonal Prediction (TFSP) to make an assessment of current skill in seasonal prediction, with particular emphasis on surface temperature and precipitation. A WCRP statement of the present state-of-the-art of seasonal forecasting, together with a forward-looking road-map of recommendations for the seasonal forecasting community will be produced as an outcome of the workshop.

A position paper prepared by the Scientific Organising Committee led by Ben Kirtman (COLA and George Mason University, USA) was available before the Workshop setting out the outline of the overall Workshop statement. This paper forms the basis of a WCRP Statement on Seasonal Prediction that is being produced as an outcome of the Workshop. Participants were invited to discuss and comment on the paper before and during the workshop.

At the workshop the so-called TFSP Experiment was presented. The experiment, built on the experience of DEMETER, is proposed by the TFSP as a comprehensive multi-model and multi-institutional experiment to determine the predictability of the complete climate system on seasonal timescales. The core experiment is an 'Interactive Atmosphere-Ocean-Land-Ice Prediction Experiment' emphasizing the use of comprehensive coupled general circulation model, which includes realistic interactions among the component models. The experiment is to perform seven-month lead ensemble (10-members) predictions of the total climate system. If possible longer leads and larger ensembles are encouraged. The initialization strategy is to use the best available observations of all the components of the climate system. The modelling community is encouraged to participate, and applications experts to apply and validate the results, particularly in terms of regional skill. ECMWF is actively taking part in the experiment with the ENSEMBLES and System 3 seasonal simulations. The plans on archiving and disseminating multi-model seasonal ensemble simulations for the TFSP Experiment closely follow the set-up of the ENSEMBLES data archiving and dissemination strategies.

Three main sessions addressed the following overall workshop objectives:

Synthesis of Seasonal Prediction Skill
To assess the state-of-the-art skill in seasonal forecasts using high quality retrospective forecast data issued from the SMIP/HFP and DEMETER Projects together with the latest results from the ENSEMBLES Project and to validate the coupled model performance.

Seasonal Prediction Skill and the Coupled System
To address seasonal prediction from a wide-ranging multi-disciplinary perspective. A brief overview of issues in ocean initialization was given, but the emphasis was on those aspects of the climate system which may enhance seasonal predictability but which are presently poorly treated in prediction models. In particular, the role of stratospheric processes, cryospheric processes and air-land interactions were examined. This session was co-organized by other WCRP Projects like SPARC, CliC and GEWEX.

Seasonal Prediction: Applications and Regional Skill
To highlight issues important for interfacing seasonal forecasts with applications including calibration, downscaling and validation, looking at whether there is an emerging consensus on approach and methodology. The World Climate Research Programme, regional CLIVAR panels (VAMOS, VACS, AAMP) and the AMMA Project contributed to this Session.

The meeting attracted many international scientists interested in seasonal predictions, and, overall, was very interesting with lots of new results being presented. The oral presentations of the workshop were complemented by three well organised poster sessions displaying more than 70 posters. Abstracts of all contributions to the workshop

are available from http://www.clivar.org/organization/wgsip/spw/spw_abstracts.php. The talks will also be made available online soon.

However, the schedule of the meeting was far too dense, as also remarked by the speaker of the last paper, S. Gadgil, on Wednesday 6 June at 5.40pm: hers was paper n. 49! As a consequence, we were somewhat overwhelmed by the amount of information we were provided with. Thus, in the following, we only summarize a couple of selected talks from the wide range of given presentations.

J. Shukla (IGES/COLA), a veteran in the field, kicked off the meeting in an egregious way by giving an overview of the status of seasonal prediction and some direction for future work. Shukla stated that there are still serious model deficiencies in simulating the present climate. He believes the main culprit in hindering progress is the way in which tropical heating is dealt with in models. Model systematic errors (eg in ENSO frequency) are visible in model forecasts. However, he also pointed out that about 25 years ago dynamical seasonal forecasting was not even conceivable; hence big steps have been made (even if he acknowledged those major breakthroughs have not been achieved). He then highlighted the main factors currently limiting predictability on the seasonal timescale: data assimilation and initialisation, the way in which the biosphere is modelled, prediction in a changing climate, seamless prediction of weather and climate, computer power. Overall it was a very nice motivational talk, but possibly a bit too packed with information.

Tim Palmer (ECMWF) gave an invited talk on seamless prediction for weather and climate. He first showed results from the AR4 multi-model ensemble on estimates of the changing probability of seasonal-mean rainfall patters associated with global warming, and asked how we can assess the reliability of these probabilities. He presented a schematic diagram showing a chain of processes which link radiative forcing to climate response, the chain including links representing fundamental physical processes such as teleconnections and air-sea interactions. He proposed that in a seamless weather/climate system, the strength of such links could be determined by seasonal forecast datasets. Motivated by this, examples of the use of seasonal forecasts to calibrate climate change projections were made using the DEMETER dataset.

The role of the ocean initialization on the skill of seasonal forecasts was discussed by M. Balmaseda and T. Rosati (from GFLD). T. Rosati presented the GFDL ocean data assimilation system, based on an EnKF of coupled model integrations. The assimilation is only done in the ocean component. Compared with their previous system (based on 3DVAR, and with quite poor skill to begin with), the EnKF significantly improved the skill scores in ENSO prediction, such that the ENSO skill levels appear to equal those of our System 3. M. Balmaseda presented the impact of ocean initialization in the ECMWF seasonal forecasting system, and quantified the contribution of observational information to the skill scores.

The session on the role of stratosphere was heavily subscribed in terms of presentations, and included much information on the state of the art of modelling and thinking on possible mechanisms of added predictability. It remains the case, however, that we still do not know what level of of skill is available to be tapped, and exactly what model improvements are needed relative to current practice in seasonal forecasting models. The

question as to whether we need to represent the full stratosphere in our extended, monthly and seasonal forecasts is particularly relevant to ECMWF.

The very last talk by S. Gadgil (CAOS Indian Institute Sci.) provided a very nice umbrella to the meeting. Her talk in fact spanned not only the science of seasonal predictions but also covered quite elegantly the way in which a very important seasonal event such as the Indian summer monsoon is linked to the economical and social texture of the Indian society. She started by showing the dramatic increase in the Gross Domestic Product (GDP) of India and in their Food Grain Production (FGP) since the 1950s. She also noted that GDP and FGP are sensitive to failures in the Indian summer monsoon, such as in 2002. In years of severe drought the impact on GDP can be up to 8% and up to 17% on FGP. She then highlighted the importance of disseminating forecast for the monsoon season but that currently the main Indian providers of seasonal forecast, the Indian Meteorological Department (IMD) and the Centre for Mathematical Modelling and Computer Simulation (CMMACS) are not in sync and, for instance in 2005, the two Institutes issued contrasting monsoon forecast which confused farmers. Finally, she presented some nice results about a very useful correlation between ENSO and Equatorial Indian Ocean Oscillation (EQUINOO) but she concluded by saying that, based on AMIP-like experiments, while AGCMs are able to simulate the response to ENSO, they are not able to simulate the observed link with EQUINOO. She attributed this deficiency to systematic model errors which prevent from achieving satisfactory one-tier (i.e. using coupled models) predictions.

3. ENSEMBLES meeting on seasonal-to-decadal activities

Following the WCRP workshop, a dedicated ENSEMBLES meeting on seasonal-to-decadal (s2d) activities was held on the afternoon of the 7th and during the 8th of June. All the ENSEMBLES Research Themes (RT) that deal with s2d data were represented and encouraged to interact during the meeting. A significant number of institutions external to ENSEMBLES but interested in the progress made in the project were also represented. The issues addressed included

- approaches to deal with model uncertainty at different time scales
- development of seamless systems
- formulation of multi-model probabilistic predictions
- model data dissemination
- ocean data analysis
- downscaling (dynamical and statistical/empirical)
- user applications

Information about the meeting, including the presentations, is available from http://www.ecmwf.int/research/EU_projects/ENSEMBLES/meetings/s2d_tfsp.html.

The first afternoon was devoted to the progress made in the production of global ensemble hindcasts as part of the RT1 and RT2A activities, as well as by some external partners. A summary of most relevant results from these presentations follows.

Antje Weisheimer (ECMWF) summarized the ECMWF status of the Stream 1 and 2 hindcasts and offered an assessment of the relative merits of the stochastic physics (CASBS) and multi-model forecast systems. She illustrated the benefits of using a stochastic physics scheme to reduce systematic errors, in particular for tropical precipitation, Northern Hemisphere winter blocking frequency and tropical Pacific sea

surface temperature (SST). The significant improvements achieved with more recent versions of the IFS/HOPE coupled model to produce decadal hindcasts were also mentioned, although much work remains to be done to reduce the magnitude of the drift.

Michel Déqué (CNRM) described the results of some hindcast experiments with alternative initialization of the atmospheric and land-surface components. He compared the results of a set of hindcasts initialized with soil and atmospheric data obtained from a run nudged to ERA40 circulation to another set initialized from a run nudged to ERA40 anomalies and a third one using the standard setup where the ERA40 data are interpolated to the ARPEGE grid. With the first two experiments he also intended to provide homogeneous initial conditions for soil moisture and snow that are consistent with the ARPEGE model, which is not the case when using ERA40 and operational analyses. He did not find a benefit in the more sophisticated initialization methods, except for the winter scores over the Northern Hemisphere. A more in-depth analysis may uncover more subtle improvements though.

Noel Keenlyside (IfM-Geomar) showed encouraging results over the North Atlantic from their decadal forecasting experiments. To initialize the decadal predictions, IfM uses a coupled SST assimilation strategy, which is expected to properly initialize the meridional overturning circulation (MOC). This method nudges SST anomalies into the ECHAM5-MPIOM coupled model over the region 30°N-30°S, with a linear decrease of the nudging from 0 to 60°. This simulation satisfactorily reproduces the MOC, the North Atlantic SSTs, the NAO and the convection in the Labrador Sea. A set of 11 3-member 10-year hindcasts with extrapolated forcings (but no volcanic aerosol during the forecast) are started over the period 1955-2005 from the SST-nudged conditions. The skill of these hindcasts for the years 6-10 is better than for simple persistence and comparable, in some regions superior, to that obtained from observed external forcings (which in a forecast are not known a priori). This is particularly the case over the North Atlantic and Europe.

Doug Smith (Met Office) described the preliminary results of the DePreSys initial-condition and perturbed parameter Stream 1 ensemble hindcasts. This forecast system, similarly to the IfM system, includes changes in sulphate aerosols and greenhouse gases in the hindcasts, but extrapolates the solar cycle and does not include volcanic aerosols (except for a decay from the start of the forecast with a damping time of 1 year). The system assimilates anomalies of atmospheric and ocean analyses into the model climate to avoid model drift and, unlike the IfM system, uses flux correction. The ENSEMBLES initial-condition system does not perform as well as the original system used at the Met Office, in part due to a warm bias, but is always better than simple persistence. The perturbed-parameter ensemble has a forecast quality similar to the initial-condition ensemble, but allows for the introduction of model uncertainty. In particular, this approach offers the possibility of comparing the forecast quality of the decadal predictions with the climate sensitivity of each model version. For instance, the Stream 1 simulations showed that the root mean square error of the global mean temperature for the 10^{th} year of the forecast decreases almost linearly with the climate sensitivity. Besides, they also found that the skill over the tropical Pacific during the first forecast season increases with the decreasing variability of the model version. More analysis will be done when the Stream 2 simulations will be available.

Andrea Alessandri (INGV) showed the changes in the INGV-CMCC forecast system (ECHAM4-OPA) due to improved ocean initial conditions. The new set of ocean initial conditions that uses the EN3 in-situ data improves ENSO and winter temperature and precipitation predictions with respect to the DEMETER/ENACT hindcasts. These initial conditions will be used along with an updated version of the INGV-CMCC forecast system to produce the Stream 2 seasonal and annual hindcasts.

Philippe Rogel (CERFACS) discussed the importance of carrying out a high-quality ensemble of ocean reanalyses to, among other things, initialize long-range ensemble forecasts. CERFACS has carried out some experimentation to assess the impact of different perturbations to generate the ensemble: SST, wind stress, evaporation minus precipitation and perturbation of the observations. CERFACS will perform a set of decadal ensemble hindcasts with the ARPEGE-NEMO system for Stream 2.

Alberto Arribas (Met Office) presented the strategy to create the Stream 2 simulations with the HadGEM forecast system. This system, which is expected to lead to the operational system Glosea 4, has higher resolution than GloSea, uses fully interactive sea-ice during the assimilation and anomaly assimilation (from ERA40) for soil moisture. Alberto then commented on issues with long hindcasts (Stream 2 simulations) and, to a certain extent, questioned whether this is really worth doing. Due to the poorer quality or lack and non-stationarity of ocean observations in the 1960s, due to climate change trends and due to the fact that systematic error is as big as the forecast signal, having long samples might not be the best way to use the resources available. He proposes a different approach with shorter samples, but with a better understanding of the origin of the signals, merging with other sources of information and periodic discussion among the experts.

Holger Pohlmann (MPI Hamburg) described one of the decadal forecasting experiments taking place outside ENSEMBLES. MPI carried out a decadal hindcast experiment with anomaly coupling similar to that performed by IfM. Both temperature and salinity anomalies from the GECCO analysis where nudged between 80°S and 80°N in the assimilation run. He claims that decadal predictions of global mean temperature, MOC and North Atlantic SSTs benefit from the ocean initialization, at least during the first few years of the prediction.

Debbie Hudson (BMRC, one of the two non-European ENSEMBLES partners) showed results from the experimentation with ALI, the atmosphere-land initialization scheme for the POAMA forecast system. The initial conditions are generated in a way similar to that described by Michel Déqué: the atmospheric GCM forced by observed SSTs is nudged towards ERA40 and the Bureau of Meteorology's operational analyses every six hours, with soil moisture and temperature being driven by the atmosphere. This way, the soil initial conditions in seasonal forecasts include intraseasonal variations, although the method does not correct for biases in the soil scheme. This initialization improves ENSO predictions for the first few months as well as OLR and continental temperature and precipitation predictions over the first month.

Augustin Vintzileos (NCEP) offered an overview of the NCEP activities in monthly, seasonal and interannual forecasting. Emphasis was made on the CFS characteristics. CFS, being a state-of-the-art long-range forecast system, seems to have problems in showing skill for Sahelian precipitation and the Madden-Julian oscillation (MJO). The next

version of CFS (expected for January 2010) will use a new reanalysis and a sea-ice model. He also described the NOAA's Climate Test Bed, which intends to accelerate the transition of scientific advances from the climate research community to improved NOAA climate forecast products and services, the NCEP multi-model strategy and the results of an experiment to assess the positive impact of horizontal resolution and atmospheric initial conditions on intraseasonal forecasts.

The session of the day finished with a presentation illustrating the importance of **linking ENSEMBLES and AMMA**: *Paolo Ruti (ENEA)* introduced the reasons why the study of the West African monsoon is important for climate. He showed that there is a wide range in the decadal trends of Sahelian precipitation in the GCMs used for climate change studies. He illustrated the relevance of the field campaign for validating models and study processes present at the intraseasonal time scale. Finally, he discussed the seasonal forecast activities during AMMA, which consist mainly in the consensus forecasts issued by ACMAD and in gathering the sort of observational information that local users are interested in.
A discussion over dinner among several participants in both projects followed. Several tentative actions were mentioned. A summary of the discussion can be found in the discussion section below.

The second day of the meeting offered a series of presentations on decadal forecasting, skill assessment and processes, downscaling and applications. *Caio Coelho (CPTEC)* showed preliminary results of the EUROBRISA project. This initiative combines the EUROSIP multi-model forecasts with empirical forecasts based on SSTs to produce calibrated precipitation probabilistic predictions downscaled over South America. Results for boreal summer precipitation show that EUROSIP has a large amount of skill in the area and that the skill is improved in the combined forecasts.

Alberto Troccoli (ECMWF) presented some results from his decadal forecasting experiments. He showed that the impact on temperature of the radiative forcing takes over from the impact of the initial conditions after the first ten years of a decadal forecast, which points at the relevance of properly initializing decadal forecasts. However, model drift is still an important issue that precludes a unified approach to the initialization of multiannual forecasts.

Prince Xavier (LMD) looked at the summer intraseasonal variability in the Indo-Pacific tropical region and its relationship with precipitation in the DEMETER integrations. The tool he used is the local mode analysis, a complex empirical orthogonal function analysis computed in moving windows of 90 days. Among the seven DEMETER models, only one of them reproduces the northward shift of the variability during the summer. This model happens to be the only one with a coupling frequency higher than one day. This seems to be a relevant phenomenon as a comparison between TMI and Reynolds SSTs suggests. Actually, there are serious deficiencies in the representation of air-sea interactions in the models. The models produce shorter, less organized modes. The actual skill of the intraseasonal variability is much smaller than its potential predictability and is strongly affected by the lack of atmospheric initial conditions.

Geert Jan van Oldenborgh (KNMI) analysed the ability of long-range forecast and climate change models to simulate the recent extremely warm seasons in Europe. West and central Europe have warmed up twice as fast as the mean global temperature, while

global models simulated only half of this warming, which agrees with the models simulating only a shift in the temperature PDF and not a change of its shape. The difference with the recent observations seems to be due to systematic errors present in, at least, the models used for climate change projections. This might be due to missing non-linear processes in the models that can explain, for instance, the misplacement of the temperature anomalies over the North Atlantic.

Andreas Weigel (Meteo Swiss) used a toy model to illustrate the benefits of the multi-model approach in a probabilistic context. He artificially generated pairs of random observations and ensemble forecasts with specified correlation and the same climatology using a Gaussian process. The overconfidence of the ensembles is also prescribed. He showed that using the RPSSd metric the multi-model can only improve with respect to the best model if single models are overconfident. This improvement can not be achieved by simply inflating the ensemble, especially when there is a certain level of skill. The results were complemented with examples from the DEMETER multi-model, for which the overconfidence parameter was computed. Interestingly, this parameter is at its largest over the tropical oceans.

Reinhard Schiemann (ETH Zurich) addressed the issue of the link of the Indian summer monsoon to the hydrological cycle in central Asia. He found that the effect of large-scale tropospheric temperature anomalies associated with the interannual variability of the Indian summer monsoon can be tracked down all the way to the hydrological cycle in the Amudarya basin. Although this relationship is contemporaneous, it might have consequences for the downscaling over the region of long-range forecasts.

Bartolomé Orfila (INM Madrid) started the session on downscaling showing results of the dynamical downscaling over Europe of the seasonal hindcasts from DEMETER, ENSEMBLES and the operational systems at ECMWF. The dynamical downscaling method is now used in real time with System 3. Examples of probabilistic forecasts for late winter 2007 over Spain carried out with a statistical downscaling method were compared with the direct model output. In both cases, he illustrated the relevance of specifying the reference period as the thresholds used to define the events can change substantially, especially for precipitation.

María Dolores Frías (Univ. of Cantabria) showed results from an assessment of the predictability of maximum temperature and precipitation over Spain linked to ENSO using a high-resolution observational dataset. Minimum temperature does not show a clear connection to ENSO. There are certain seasons, variables and events that show a link with specific phases of ENSO, which indicates the non-linear relationship suggested by previous studies. The DEMETER hindcasts downscaled using an analog approach provide some skill for events similar to those uncovered in the teleconnection analysis.

Angel Utset (ITACYL) described a user perspective of the climate forecasting problem in the framework of the AGRIDEMA project. AGRIDEMA is a EU-funded specific support action that intends to provide a link and feedback mechanisms between climate information producers, agricultural modellers and European managers of crop yield and irrigation. He emphasized the need to adequately communicate climate information to agricultural managers, who are the intermediate step between the climate forecast producer and the farmer.

Discussions took place at several stages of the meeting. Here there is a summary of the main topics dealt with:

Management of ENSEMBLES: *Chris Hewitt (ENSEMBLES director)* gave a brief talk explaining the latest news concerning the overall project. Among other issues, he mentioned that

- the s2d activities do not have any missing deliverables or milestones (a success in itself when compared to other sections of the project)
- problems at the Commission made the last pre-financing to be short of 1.000.000 €
- the next general assembly will take place in Prague in November 2007
- the number of institutions asking to be affiliated is still increasing
- the reporting period starts in July, where the next detailed implementation plan will have to include activities up to the end of the project

Antje and Paco asked the partners for

- more feedback to keep improving the RT1 web site because the site contains most of the information relevant to s2d, but almost no information of the other activities that take place in RT1
- information about sea-ice initialization, a problem with important potential implications given the large uncertainty in sea-ice depth and the strong error in high-latitude fluxes.

They also informed the partners that the results of the comprehensive analyses carried out with the Stream 1 simulations will be soon available on the web site and that the suite of tools used to make the forecast quality assessment is expected to be accessible to the partners before the end of the project to analyse their own simulations at ECMWF. Geert Jan van Oldenborgh also reminded the availability of the Climate Explorer for exploratory analysis.

It was decided that the work for the last two years of the project would be discussed during the process of preparing the detailed implementation plan.

Collaboration with AMMA: *Jan Polcher (AMMA coordinator)* offered a brief summary of the discussion that took place between several AMMA and ENSEMBLES representatives. There will be three main topics for collaboration between both projects:

- dynamical downscaling of the ENSEMBLES climate change projections over West Africa as a non-European area, with a main focus on water management
- seasonal forecasting including a comparison between the ENSEMBLES seasonal hindcasts and the PRESAO forecasts over past years, with a focus on providing climate information for food production and security systems
- global model validation in the spirit of the AMMA-MIP analysis carried out with the AR4 simulations. AMMA expects to have access to the ENSEMBLES simulations (while the s2d data are public, the global and regional climate change simulations have still a restricted access policy) and to the publications made in the framework of ENSEMBLES to solve the chronic lack of information of African scientists. At the time of writing, examples of files with multi-model seasonal hindcasts have been distributed to get the AMMA-MIP analysis started. A list of variables of interest for African users should be ready in the coming months, the

same as a preliminary comparison between different forecast systems over the region.

Progress with the Stream 2 simulations: Some partners (IfM, ECMWF, CNRM) have already completed or are close to finish their Stream 2 hindcasts. The ECMWF hindcasts are already available from MARS and the other models will be stored in MARS in the coming weeks. The rest of the partners do not foresee any delay to complete their hindcasts on time. It is expected that a more in-depth analysis of the Stream 1 hindcasts (publicly available from the ECMWF data server) will be carried out in the coming months, as well as an analysis of the Stream 2 hindcasts before the end of the project. Concerning the hindcasts, Bartolomé Orfila reminded the modellers that INM will be interested in downscaling the seasonal integrations of those models that archive model-level data, as they already did with the ECMWF and Glosea Stream 1 hindcsts.

The ENSEMBLES decadal predictions will be a significant contribution to the development of a decadal forecasting capability sponsored by WCRP. Several of the ENSEMBLES partners will perform the coordinated experiment proposed by Tim Palmer.

It was decided that James Murphy will submit a proposal linked to the s2d activities for a cross-cutting session at the next general assembly. At the time of writing, the title of this session is “Assessing and developing ENSEMBLES approaches to climate prediction from a season to a few decades ahead”. The session should cover two topics. Firstly, a more in-depth look at the skill and utility of the different hindcasts available, and secondly, the discussion of a coordinated climate prediction experiment for up to 30 years ahead, in order to exploit the community and experience ENSEMBLES has managed to draw together. This latter topic might be somehow linked to the IPCC AR5 near-term climate prediction activities, and the likely focuses it will place on are predictions for the next few decades.

4. WGSIP meeting

A full report of the meeting will be published on the CLIVAR web-site in due course - only a few key points are highlighted here.

The JSC are proposing several new “cross-cutting themes”, one of which is decadal prediction. Tim Palmer has outlined a specific (modest) proposal to start coordinated experimentation on this topic. WGSIP have been asked to coordinate this work jointly with WGCM. After some discussion, in which the clear scientific merit of the involvement was weighed against the overall WGSIP workload, WGSIP agreed to take on this task.

The TFSP experimentation was reviewed, with particular regard to the input at the workshop on the possible role of the stratosphere, cryosphere and land surface. For soil moisture, it was agreed that it would be useful to test the “recommended method” of soil moisture initialization using GSWP forcings, by comparison against other soil moisture analyses and the (very limited) data available.

Data handling for the TFSP project was reviewed. Some resources might be available from the APCC (Asia-Pacific Climate Centre, based in Busan, South Korea), but the level of support could not be confirmed. The overall strategy of a distributed system was confirmed, with the work done at ECMWF on the ENSEMBLES opeNDAP server a firm

prototype. Issues of CF extensions to support multi-model ensemble forecasts were progressing. The initial priority will be to serve the atmosphere fields on a common 2.5 degree grid - the ocean data may lag behind in some cases. The possibility to retrieve data on the original grid is desirable, but will not form part of the coordinated data archive at this stage.

The issue of ocean model testing and initialization was discussed. WGSIP was happy that the Pacific Panel was proposing to study ocean model sensitivities in the context of the CORE framework developed by WGOMD. WGSIP also recognized the value of its providing scientific guidance on standard initialization methods for ocean models using only surface forcing, appropriate for seasonal forecasting, and would seek to develop such guidance. However, WGSIP did not want to go beyond this and organize any specific intercomparison projects in this area.

WGSIP had been requested by WCRP to consider providing input to the planning stages of the next IPCC assessment round. It was agreed that while direct IPCC involvement was beyond the means of WGSIP, it would be worthwhile to provide some input, and it may be that an interested representative will attend an initial meeting.