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Report

From the 6th to the 9th of September 2010 I participated in the ECMWF annual seminar on Predictability in the European and Atlantic regions from days to years. Details regarding the seminar and all presentations are available at: www.ecmwf.int/newsevents/meetings/annual_seminar/2010/index.html.

Seminar topics included: (1) dynamical understanding of weather and climate variability over Europe, (2) predictability and predictive skill of actual operational systems from daily to seasonal scales, (3) influence of ocean / land-surface / stratospheric conditions on Europe and (4) looking ahead: areas of possible / expected progress.

I found talks very stimulating although several serious limitations of the current methods have been brought up. When faced with such serious limitations, one can feel either depressed or inspired. I would like to mention a few interesting topics but definitely not mentioning all of them:

The transition between the troposphere and stratosphere over the Atlantic ocean can act as a waveguide for the disturbances that occur on the eastern shores of the United States. An example of the evolution of atmospheric disturbance following next steps was shown: (1) the formation of the tropical cyclone, (2) propagation of the cyclone over the American continent, (3) interaction with the waveguide in the middle latitudes, (4) transition into extratropical cyclone, (5) continuation of cyclogenesis over the UK (6) interaction of the cyclone with the flow over the continent, and finally (7) cyclogenesis in the Gulf of Genoa.

It is possible to link the variability over Europe (1) on the synoptic time scale to e.g. blockings, (2) on a scale intraseasonal time scale to e.g. the Madden-Julian oscillation, (3) on the annual time scale to e.g. ENSO, and (4) on decadal time scale e.g. with the variations in the tropical Atlantic and the meridional overturning circulation in the Atlantic.

Although the skill of ECMWF seasonal forecasts over Europe is small, if the system (in general any seasonal prediction system) predicts well only the extreme cases (e.g. very dry period) it can provide important and useful information. In this case, it is important it to be robust in forecasting extreme events. There is a need for a robust model and that there is much room for improvement of the existing models. However, one should expect a slow development of models/systems for seasonal prediction.

A new NCEP reanalysis CFSR was presented. Interesting features include: (1) forecasting models for the ocean, sea ice and soil, (2) taking into the account the increase of CO_2 during the interval of reanalysis and (3) assimilation in which the measurements of T2m are not taken. One of the outcomes associated with (3) is that the CFSR properly simulates global mean T2m although it assimilated all the available data except T2m.

An extremely informative overview of modelling sea ice was done. An absolute minimum seas ice area over Artic during summer 2007 can be partly explained by increasing temperature, but this period was also characterized by persistent atmospheric circulation that forced motion of sea ice. On the climatic scale, the models are similar to each other for the simulation of the sea ice area coverage during the winter but there is a strong divergence in the case of the summer.

In situations of extreme weather the question is brought up of whether and how human activities affected the risk of extreme phenomena. Currently there are no sufficiently developed and general methods developed which would join the consequences of an extreme phenomena and it causes. In addition to the typical human influence on temperature rise and changes in other properties of the atmosphere, surface modifications (e.g. urbanization) may increase vulnerability of society to extreme weather.

In the end, I would like to thank the EMS for providing support for my participation in this seminar.

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