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ON INTEGRATED OBSERVING SYSTEMS

ITEM: 8

EXPERT TEAM ON OBSERVATIONAL DATA REQUIREMENTS
AND REDESIGN OF THE GLOBAL OBSERVING SYSTEM

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FOURTH SESSION

GENEVA, SWITZERLAND, 28 JANUARY-1 FEBRUARY 2002

NWP Centre Plans for OSEs in 2001 – 2002

(Submitted by the Chairman)

Summary and Purpose of Document

The Expert Team at its meeting in April 2001 suggested seven OSEs for consideration by NWP centres and asked the OSE/OSSE rapporteurs to engage as many as possible in this work. Information on plans and activities already carried out by the contributing NWP centres is presented in the Appendix to this document.

ACTION PROPOSED

The meeting is invited to take into consideration the plans and responsibilities of NWP centres when discussing status of implementation and preliminary results of OSEs.

Appendix: NWP Centre Plans for OSEs in 2001 – 2002

NWP Centre Plans for OSEs in 2001 – 2002

The OPAG-IOS Expert Team on data requirements and the redesign of the global observing system (ET-ODRRGOS) at its recent meeting in April 2001 suggested seven OSEs for consideration by NWP centres and asked the OSE/OSSE rapporteurs (Jean Pailleux and Nobuo Sato) to engage as many as possible in this work. The proposed OSEs and the contributing NWP centers are listed below.

Proposed OSEs

1. impact of hourly SYNOPs (ECMWF),

2. impact of denial of radiosonde data globally above the tropopause (Canadian AES),

3. information content of the Siberian radiosonde network and its changes during last decades (Univ St Petersburg, NCEP),

4. impact of AMDAR data over Africa through data denial in a 4D-Var analysis and forecasting system (ECMWF, Meteo France, NCEP),

5. impact of tropical radiosonde data (Met Office, Meteo France, JMA),

6. impact of three LEO AMSU-like sounders (NOAA 15 and 16 and AQUA), and (Met Office, NCEP, JMA),

7. impact of AIRS data (ECMWF, Met Office, NCEP, BMRC, JMA).

Plans of the contributing NWP centres

ECMWF

For OSE 1, ECMWF will document previous experiments with 6-hour 4D-Var and start a new assimilation experiment high resolution T511/T159 12h 4D-Var.

For OSE 4, ECMWF has two alternative scenarios. One experiment with high resolution (T511/T159) denial of ascent/descent or several experiments with low resolution (T159/T63) (with no wind profiles; US profiler network only; aircraft ascent/descent only; orall available wind profiles)

Regarding OSE 5, there are no radiosonde experiments (tropics) planned.

For OSE 7, there are several considerations. When will data be available? It is on the Centre´s critical path for operations. It will be subject to a tuning exercise.

With ERA-40, there will be several OSEs done as part of the scientific programme to study the impact of the increments in the ERA 40 observing systems, including the Russian radiosonde network degradation relevant to OSE 3. First results are to be presented at the ECMWF Re-analysis Workshop in November 2001.

Met Office (UK)

UK Met Office hopes to be able to conduct OSE 5 (impact of tropical radiosondes) before next summer, assuming no unforeseen demands on their resources in this area.

They also expect to conduct OSE.6 (impact of three LEO AMSU-like sounders) and OSE.7 (impact of AIRS data) at some point in the future but, with current planned launch dates for DMSP and AQUA, it is clear that they will not be in a position to do these before summer 2002.

Meteo France

Meteo-France will do as much as possible related to OSE.4 (impact of AMDAR data over Africa) and OSE 5 (impact of tropical radiosonde data). OSE 5 encompasses several OSEs and it is unclear how many can be done with available resources.

Meteo-Fance has already started to prepare observation files for running OSEs on a 2-week period starting 1 June 2000, 00Z (a period which was of particular concern regarding forecasts over Sahara). Two African visitors are going to work with them on this subject for a couple of months. The plan is to start running one "control" plus one "test" assimilation. They will start by running V.5 - removing all the radiosondes in 20S-20N (plus possibly ascents and descents from aircraft) using an unstretched ARPEGE with 3D-VAR.

MGO of Roshydromet

In 2002, the Main Geophysical Observatory (MGO) of Roshydromet will pursue OSE 3 regarding the information content of the Siberian radiosonde network and its changes during last decades. Dr Pokrovsky is preparing several maps of Russian radiosonde launches corresponding to three month distributions: Oct 1999 (it was a "down month" in the radiosonde number history), Jan 2000 (used in the NCEP study presented at Geneve) and Apr 2001 (current state). The information content corresponding to these three cases will be studied.

NCEP

NCEP will be contributing to OSE 3 by continuing with its study of the impact in the degradation of the Russian radiosonde network.

OSE 4 will be studied with evaluation of AMDAR over AFRICA (working as an advisor to the South African Weather Bureau) and exploring the usefulness of AMDAR data in the Caribbean.

NCEP will evaluate the impact of AMSU from three LEOs for OSE 6.

After AQUA launch, the impact of AIRS data will be studied for OSE 7.

In addition, NCEP will study observation targeting for winter storm experiments and hurricanes and continue to foster progress with assimilation of satellite data over land using a variety of data.

BMRC

Regarding OSE1 (Impact of hourly SYNOPS), BMRC is using hourly data to run a mesoscale surface analysis. They are experimenting with ways of using this in their regional analysis scheme. At this stage their main focus is developing a 3D-var system.

For OSE 2 (Denial of radiosonde data above the tropopause), BMRC notes that radiosonde data is seen to be required for tuning satellite based data and it is thought to be pointless to ignore it.

With respect to OSE 4 (Impact of AMDAR data over Africa) and OSE 5 (Impact of tropical radiosonde data) BMRC expresses considerable interest, particularly experiments with tropical data, but they are unable to commit a substantial effort.

For OSE 6 (Impact of three LEO AMSU-like sounders) and OSE 7 (Impact of AIRS data), BMRC expects to run impact experiments on AIRS data on both global and regional scales when the data is available in March next year.

In addition, BMRC is working on assimilation of quickscat data with some encouraging initial results. They expect to run full-scale impact studies on both the global and regional scales in the near future. BMRC also will continue to monitor the impact of the PAOB data generated here as the amount and type of remotely sensed data in our assimilation system grows.

Canada

Canada expects that OSE 1 will require 4D-var capabilities which are still under development. That said, they indicate that the use of surface data in combination with satellite data is a very interesting and worthwhile experiment. In the last year they spent considerable time adapting 3D-var to better use of surface data including problems related to differences in model versus true topography. They suggest that some of the reporting practices concerning surface pressure or its equivalent and reporting practices below topography could be revised given how today's systems have evolved. However, OSE 1 is very low priority, and Canada will not participate.

OSE 2 is felt to be very pertinent since there are already doubts about the quality of radiosondes above 70 hPa and this OSE may in fact shed some light on this. Satellite data, particularly from future instruments will undoubtedly bring much more information there which will in the long run most likely replace radiosondes as our best source of stratospheric data. Forecast accuracy, particularly in the 5-10 day range is undoubtedly influenced by the accuracy of stratospheric analyses and we have to quantify this. Calibration using radiosonde data above 70 hPa, given the biases in temperature there, is somewhat doubtful but again only such experiments will help understand the problem. Canadian plans in the current year are to raise the NWP model top to 1 hPa and above which is a pre-requisite to undertake such an OSE, but if everything goes according to plan, they will definitely participate in OSE 2.

Regarding OSE 3, Canada has some reservations as it could be very costly given the time required in the preparation of the 10-year retrospective data. So their requirement in participating to this OSE is that they have access to the re-analysis data from ECMWF. If all the participants would use a common dataset, this will make it a better scientifically controlled OSE. The results from this OSE are felt to be very important; there is often the question regarding impact in the 5-10 day range if these raobs are over NA. Canada has looked at few sensitivity analyses related to bust forecasts over NA, and they have pointed directly to large errors over Siberia.

Canada is somewhat interested in OSE 4 since Canada will be producing AMDAR data in the near future. However they are not yet ready with 4D-var and would not likely participate in a study over Africa.

Regarding OSE 5, Canada has noted a significant 12-hour beating in the tropics related to the alternating radiosonde network in the tropics. Satellite winds and radiances should play a larger role in the tropics since very little other data sources are available, particularly during the hurricane season. They are aware of the difficulties related to the tropics, but it is currently low on their priority.

For OSE 6 and OSE 7, Canada is already involved in studies related to SSMI/S and Aqua/AMSU as well as AIRS and would as much as possible try and fit this work with participation to this OSE.

JMA

OSE 1 is interesting and worthy of trial.

With regard to OSE 2, it is felt that in-situ data from the stratosphere is essential to remove biases in direct assimilation of TOVS radiances.

OSE 3 is important, but JMA already has results from NCEP and can wait until the results from ERA40 are shown in half a year.

Because of the dramatic increase of AMDAR data around the globe, OSE 4 is felt to be a good OSE.

For OSE 5, JMA thinks the tropical Pacific wind profiler network will be important to predict westerly bursts that trigger El Nino. Their focus will be on this.

OSE 6 will have a large impact to NWP community.

OSE 7 will be taken up by a global group. Every major NWP center is interested in the assimilation of interferometric sounder data and AIRS data assimilation. Progress will be reported in several fora.

Furthermore, JMA would like to propose that an OSE targeted for mesoscale weather phenomena such as heavy precipitation should be added. The mesoscale OSEs proposed are

- impact studies of in-situ data from doppler radar, wind profiler, aircraft, ground based GPS network etc…

- impact studies of satellite data, particularly, moisture and precipitation data.(regional model impact studies may not be appropriate for OSE/OSSEs because the predicted fields such as geopotential height and wind used in the evaluation of the observational data impact have rather large-scale horizontal structure and they are affected by lateral boundary conditions given by the larger model or global model).

To summarize, JMA will carry out OSEs on the impact of tropical PacificWind Profiler network. This may have some relation with OSE 5. They are interested in OSE 7, the impact study of AIRS data. They will do it in collaboration with university researchers and professors using their data assimilation system. OSE 6 is also an interesting OSE and JMA is very much inclined to participate. With regard to OSE 3, they would like to carry out some kind of OSE in the context of THORPEX.
