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# STATUS AND RESULTS OF OSEs

## OSE Activities Relevant for the Evolution of the GOS

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**Summary and Purpose of Document**

This document reports status of the eight OSEs proposed by ET-ODRRGOS and informs on trends in formulating future OSEs.


## ACTION PROPOSED

The meeting is invited to take into consideration the information contained in this document when discussing status and results of OSEs.

## DISCUSSION

### 1. GENERAL

1.1 NWP centres run more and more impact studies on various observing systems. More global OSEs have been run these last few years because of the new emerging satellite instruments (AMSU, AIRS, MODIS). Several "standard" global OSEs are also now rerun periodically by some centres, such as the studies quantifying the impact of the whole radiosonde network, or the impact of the ensemble of all satellite data. More emphasis is also now put on the meso-scale observing systems for running OSEs (radars, GPS, geostationary satellite radiances).

1.2 The 3rd workshop on the impact of various observing systems is now planned in March 2004 in Alpbach (Austria). Before drawing conclusions which are relevant for the future GOS, several days will be spent in this workshop on a careful compilation of OSE results from global scale to meso-scale.

1.3 Instead of giving a status report on OSE results (this will come out from the Alpbach workshop), this paper concentrates on a series of 8 impact studies which were originally recommended by the ET-ODRRGOS, in order to answer specific questions about the future GOS. A very good response was given to these recommendations and most of these OSEs have now been run, at least in one centre (section 2). Some significant trends concerning the few coming years are also given (section 3).

### 2. STATUS OF THE 8 OSEs SUGGESTED BY THE ET-ODRRGOS

- ***Impact of hourly surface pressure data*** *(vs –hourly reports):* impact evaluated by at least ECMWF; in addition the impact of surface pressure data has been evaluated vs surface wind observations.
- ***Impact of stratospheric observations from radiosondes****:* evaluated at least by the Canadian NWP centre, on different seasons, and with different resolutions in the stratosphere.
- ***Information content of the Siberian Radiosonde Network****:* a study is ongoing in MGO (St Petersburg): this is not a classical OSE, but a statistical study based on the notion of information content.
- ***Impact of AMDAR data over Africa****:* this experiment was planned in Météo-France in 2001-2002, in collaboration with some African Met services. But it could not be carried out because the staff was eventually not available.
- ***Impact of tropical radiosonde data***: performed at least in Météo-France and in the Met Office, with a consistent positive impact coming from the South Asia tropical belt.
- ***Impact of 3 AMSU-like sounders****:* performed by several NWP global centres, among a large series of experiments using 0, 1,2, 3 or more satellites.
- ***Impact of AIRS data****:* ongoing in several centres
- ***Impact of frequent ascent/descent AMDAR data****:* this is a specific EUCOS study, which is pending; specific AMDAR data sets have just been collected and distributed by EUCOS.

2.1 Basically, only experiment 4 ***(Impact of AMDAR data over Africa)*** could not be run, and some other aircraft data experiments can bring indirectly some light in the utility of AMDAR data over Africa.

## 3. SIGNIFICANT TRENDS IN OSEs

3.1 As the variety of satellite data usable in NWP becomes larger and larger, there are more and more impact studies performed on satellite data in NWP centres. Various combinations have to be tested, for example, to evaluate the complementarity of satellite sounders, with satellite surface data (scatterometer, SSM/I) and/or automated motion wands derived from imagery. Altogether, the synergy between the different satellite components seems to work well, at least in the ECMWF 4D-VAR which shows now a very large impact of the ensemble of satellite data on the northern hemisphere forecasts (this impact is larger than the impact of the radiosonde data in a recent experiment).

3.2 This trend should be encouraged with a special accent on emerging instruments, such as GPS radio-occultation observing systems or satellite-borne Doppler Wind Lidar observations (DWL). For GPS radio-occultation data (available now on several experimental satellite missions, but not for meteorological operations), an important question is its complementarity with high-resolution vertical sounders especially in the stratosphere and upper troposphere (in addition to its impact in itself). For DWL data, the ADM-AEOLUS mission (ESA) will be the first opportunity to study the need for vertical wind profiles worldwide. At the global scale, this lack of wind profile observations in many large areas, is probably still the main weak point of the GOS, which has to be addressed.

3.4 Several impact studies are run or planned on observing systems like radar, surface-based GPS stations, wind profilers, humidity bogus data derived from satellite imagery, which is consistent with the current increasing efforts in meso-scale data assimilations.

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