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Representing CCI and World Climate Services Programme (data and monitoring part) in support to NMHS operational climate monitoring activities

Topic to be addressed: Use of satellite-based products in WMO operational climate monitoring activities, particularly

- WMO Annual Statements on the Status of the Global Climate (and aggregated five and ten years statements); additional reading cf. http://www.wmo.int/pages/prog/wcp/wcdmp/CA_2.php
- WMO Regional Climate Centres including Climate Watch systems; additional reading cf. <http://www.wmo.int/pages/prog/wcp/wcasp/rcc/rcc.php> and http://www.wmo.int/pages/prog/wcp/wcdmp/index_en.php (-> Climate Watch system)
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Introductory note:

As a matter of fact, WMO climate monitoring relies basically on **national** in-situ data and assessments for historical reasons, especially as satellite data became available only from 1960s with the ability to generate robust time series from the 1990s. Accordingly, satellite-based data have been introduced in WMO climate monitoring activities over the last twenty years.

Key chapters of the WMO Annual Statement (reflecting key data needs):

Global temperature analyses

Global precipitation and snow cover analyses

Oceans (SST, heat content, sea level)

El Nino including global impacts

Cryosphere (sea ice extent, Greenland melt area etc)

Regional extremes (particularly heat- and cold waves, heavy precip/flooding, drought/wild fires, extremes and records)

Tropical cyclones (number, track, impact)

Greenhouse gases (status, trends)

Stratospheric ozone/ ozone-depleting substances (status, trends)

Required additional content: impact information (impact of climate anomalies and extremes)

RCC functions including Climate Watch

RCC mandatory functions regarding climate monitoring:

- Perform climate diagnostics incl. analysis of climate variability and extremes, at regional and national scales (Mean, max, Min temperatures, total precip, other elements)
- Establish an historical reference climatology
- Implement regional Climate Watch
- (Develop quality controlled regional climate datasets, gridded where applicable)

Climate Watch: Provide advisories on ongoing and expected climate anomalies with potentially reverse impacts on societies (e.g. droughts, heavy precip/flooding, heat/cold waves etc.)

Climate Watch system consists of pillars: climate data, climate monitoring, Long-range Forecasting, Communication

Climate Watch advisories are a national responsibility with a high potential for RCCs to provide regional guidance information

Climate Watch data and monitoring requirements depends on regional/national vulnerabilities and risks, and hence are different for different regions (e.g. cold spells/icing in the far North and South; sand storms, monsoon characteristics/precip, cyclones in the Tropics; sand storms in West Asia; droughts for drought-prone areas etc); WMO runs regional Climate Watch implementation workshops to identify priorities

Conclusion

Satellite data and products are used already for WMO climate monitoring activities, however, to extend its use to cover areas with sparse or missing in-situ observations and/or to introduce new variables and indices, the following topics should be considered:

- Robust data sets, well maintained, qc'd (homogenised where feasible) and documented, that span ideally 30 years (for context information/climatology), and that are likely to be maintained in the future (TT URSDCM is investigating the ECV inventory accordingly)
- Capacity development for NMHSs to enable the most efficient use of satellite data for national climate monitoring, analyses and assessments
- High-resolution data sets based on robust methodology to enable time series analyses including extremes identification
- Availability of quasi real-time products to feed daily/weekly/monthly operational climate monitoring activities
- Integrated data sets; improved coordination of in-situ, remote sensing and reanalysis communities

The short discussion revealed the need to develop integrated Guidelines for Members to efficiently apply in-situ and remote sensing (and reanalysis) data including addressing the different data characteristics (station data vs areal data).

