How does impact modelling of soil moisture compare to Earth Observation data?

Earth Observation (EO) data provides relevant information for most indicators. In the CEOS Portal (Committee on Earth Observation Satellites), a summary of all measurements provided by EO satellites can be found. Several indicators are also measured by EO means (e.g. precipitation and temperature), and others can be derived from EO measurements using different techniques (e.g. flood recurrence and snow water equivalent).

When looking at both sources of data, EO and modelled data, one can imagine that the spatial and temporal coverage of EO datasets could be a limitation for climate studies because:

- Climate studies use long-term datasets that cover a minimum of 30 years, Most EO satellites were launched after the 1980s, thus available datasets rarely cover 30 seamless years, making it difficult to match the reference period of climate studies.
- The ensemble of satellite data needs to be harmonised, intercalibrated and reprocessed to be suitable for Climate Change analysis, therefore, even where long-term EO datasets exist, a direct use of these observations could be misleading.

Example: Soil Moisture

The latest CCI Soil Moisture data release was used to evaluate the soil moisture indicator. A Soil Moisture CCI combined product was used, which merges microwave data from higher frequency radiometers and C-band scatterometers, offering daily surface soil moisture at a spatial resolution of 0.25 degrees, from 1978 to 2014 (further information). Thirty years of data were selected from the CCI and averaged into the same 10-day window when counting the days from the first day of each year, for comparison with soil moisture indicator.

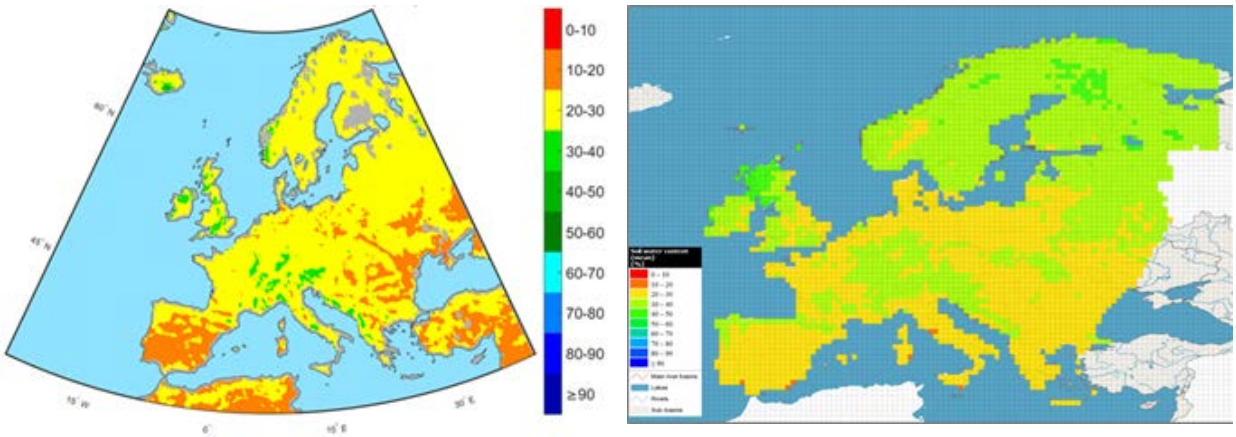

Figure 1. Left: ESA CCI active and passive merged data representation for pan European area from 1978-2009 at a resolution of 0.25 degree (in %). Right: impact model map for pan European area from 1971-2000 at 0.5 degree resolution (in relative %). It shows the results of the soil moisture variable (soil water content variable in the impact model) for Europe expressed in % units averaged over 30 years of ESA CCI data (1978-2009 reference period). These reference periods are different, but the closest period of 30 years of data that could be compared.