GlobTemperature

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Land surface temperature (LST) is the mean radiative skin temperature of an area of land resulting from the mean balance of solar heating and land-atmosphere cooling fluxes. It is a basic determinant of the terrestrial thermal behaviour, as it controls the effective radiating temperature of the Earth's surface. The sensitivity of LST to soil moisture and vegetation cover means it is an important component in numerous applications. For instance, LST is a key boundary condition in land surface models, which determine the surface to atmosphere fluxes of heat, water and carbon; thus influencing cloud cover, precipitation and atmospheric chemistry predictions within General Circulation Models. Changes in land-surface cover can affect global climate, and also can be identified by changes in their surface temperatures. With the demand of LST data from Earth Observation currently experiencing considerable growth it is important that the users of this data are appropriately engaged by the LST community.

The GlobTemperature project under the Data User Element of ESA's 4th Earth Observation Envelope Programme (2013-2017) aims to promote the wider uptake of global-scale satellite LST by the research and operational user communities. As such, the programme of work is focussed on achieving some innovative milestones for LST data which include: detailed global merged geostationary (GEO) and low earth orbit (LEO) data sets with estimates of both clear-sky and under-cloud LST; a first Climate Data Record for LST for the ATSR series of instruments; and the provision of a globally representative and consistent in-situ validation and intercomparison matchup database. Furthermore, the strength of such a venture lies in the coherence and openness of the interactions with the LST and user communities. For instance: detailed user input into the specifications and subsequent testing of the LST data sets; sustained access to data in a user-friendly manner through common data formats; and the establishment of an LST working group (LST-WG) involving strong guidance of key international experts.

GlobTemperature is thus a timely initiative to both enhance the portfolio of LST products from Earth Observation, while concurrently breaking down the barriers to successful application of such data through a programme of dialogue between the data providers and data users. This will require activities at a range of national facilities. For example, GlobTemperature is supported by the National Centre for Earth Observation (NCEO) in the UK with significant data processing and archiving to be performed on the Climate and Environmental Monitoring from Space (CEMS) facility. The project will have a very beneficial impact on global measurements of LST and will meet a critical need amongst users of LST data. Here we present the key challenges of such a programme of work and the methods to be employed in order to overcome them.