Earth's skin temperature: the underrated variable tracer of the global climate

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Earth's skin temperature (Tskin), or the combination of land and sea surface temperatures (LST and SST), is an essential climate variable (ECV) that can be measured by remote sensors on board different satellites. The use of Tskin for climate records is less documented than that of near-surface temperature, although it is the most obvious indicator of the Earth's thermal radiative emission.

In this presentation, we argue that Tskin, as an ECV, is extremely valuable to characterize the Earth's climate and its variability: it represents the surface temperature of the uppermost layer of Earth, and depends on the energy fluxes between the surface and the atmosphere. Tskin is useful to study the Earth's energy balance, convection at the surface, monitoring droughts, land use, atmospheric chemistry and dynamics near the surface, among many other applications.

We discuss the challenges in the retrieval of Tskin from infrared satellites measurements by focusing on AIRS (The Atmospheric Infrared Sounder) and IASI (Infrared Atmospheric Sounder Interferometer) on board of the Aqua and Metop satellites since 2002 and 2006 respectively. We discuss the spatio-temporal variability of Tskin, urban heat islands, land use change evolution, Tskin trends and how they compare to near surface trends.