# 4.224 Earth’s Land Surface Temperature as a Tracer for Climate Change.

Early Career Scientist

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Abstract:

While long-term temperature time series mostly rely on weather stations, only satellite data are able to provide systematic global temperature data, from pole to pole on a regular basis, over both land and sea. Satellites do not measure the near-surface air temperature; instead they measure the land’s surface or “skin” temperature (LST) derived from upwelling radiation at the Earth’s land surface. The evolution of skin temperature is not yet fully exploited as its measurement is fairly recent.
One of the IASI-Flux and Temperature ERC project tasks aims at providing new climate benchmarks by using skin temperature observations from the calibrated radiances measured twice a day at any location by the IASI thermal infrared instrument on the suite of MetOp satellites (2006-2025). The uniqueness of this project is that the IASI-data record will be absolutely “clean”, with no other data from observations or models used, and can therefore serve as an independent reference to e.g. reanalysis, or other climate data records.
In order to derive independent temperature time series, we use an iterative method combined with neural networks to construct a consistent skin temperature record over the period 2007-present.
In this presentation, we compare and validate our novel and simple method with far more complicated datasets (e.g. EUMETSAT and ECMWF reanalaysis). We then show the increase/decrease in skin temperature, over land and sea, and in different regions in the world. The observed trends are analyzed at seasonal and regional scales in order to disentangle natural (weather/dynamical) variability and human-induced climate forcing. Finally, we show how expanding cities are hotspots for skin temperature reflecting the usefulness of skin temperature as a tracer for human-induced land use and climate change.