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Remote sensing of surface temperature for climate applications

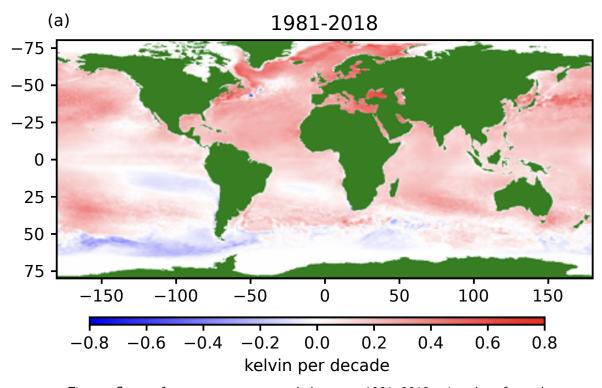(a)   1981-2018

kelvin per decade

Figure: Sea surface temperature trends between 1981–2018 using data from the European Space Agency (ESA) Climate Change Initiative (CCI) project.

Sea and land surface temperature are both recognised by the Global Climate Observing System (GCOS) as Essential Climate Variables (ECVs). As such, significant efforts have been made to generate Climate Data Records (CDRs) for both variables, with remote sensing data playing a significant role in increasing our understanding of how global surface temperatures have changed over the last forty years. The applications of these CDRs are numerous and varied, e.g., using them to understand temperature trends and variability, intercomparison of observations and models, combining them with other datasets to generate early warning systems for airborne pests, and designing new higher-resolution satellite missions to name but a few. In this talk I will present a basic introduction to thermal remote sensing, focusing on my contributions to dataset production, predominantly in the areas of cloud detection (an essential pre-processing step) and calculating the uncertainty in the retrieved surface temperature. I will then showcase a number of different applications of the data, highlighting the variety of projects that make use of surface temperature CDRs.