



The Surface Temperatures of the Earth: Steps towards Integrated Understanding of Variability and Change

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Surface temperature is a key aspect of weather and climate, relevant to human health, agriculture and leisure, ecosystem services, infrastructure development and economic activity. In a community-based activity, the Earth-Temp Network brought together 55 researchers from 5 continents to improve the interaction between scientific communities who focus on particular domains, to exploit the strengths of different observing systems and to better meet the needs of different communities. The Network identified key needs for progress towards meeting societal needs for surface temperature understanding and information, which will be reviewed and discussed in this contribution. A "whole-Earth" perspective is required with more integrated, collaborative approaches to observing and understanding Earth's various surface temperatures. It is necessary to build understanding of the relationships of different surface temperatures, where presently inadequate, and undertake large-scale systematic intercomparisons. Datasets need to be easier to obtain and exploit for a wide constituency of users, with the differences and complementarities communicated in readily understood terms, and realistic and consistent uncertainty information. Steps are also recommended to curate and make available data that are presently inaccessible, develop new observing systems and build capacities to accelerate progress in the accuracy and usability of surface temperature datasets.