EUSTACE: EU Surface Temperature for All Corners of Earth

What is EUSTACE?

EUSTACE will give publicly available daily estimates of surface air temperature since 1850 across the globe for the first time by combining surface and satellite data using novel statistical techniques.

Why EUSTACE?

Day-to-day variations in surface air temperature affect society in many ways:

- Health and well-being: it can cause cold stress or heat stress
- Food security: link between surface air temperature and crop growth and animal health
- Energy: influence on the demand for heating or cooling, high temperatures compromise the efficiency of solar panels
- Commerce: it affects the sales of a large variety of products
- Tourism: it affects the attractiveness of a region, risk for bush fires
- Infrastructure: extremes affect the functioning of bridges, railways




However, daily surface air temperature measurements are not available everywhere. Satellite data can be used to estimate temperatures at locations where no ground or in situ observations are available. To achieve this, we must develop an understanding of the relationships between traditional (land and marine) surface air temperature measurements and satellite measurements, i.e. Land Surface Temperature, Ice Surface Temperature, Sea Surface Temperature and Lake Surface Water Temperature. These relationships can be derived either empirically or with the help of physical models.

How?

The EUSTACE project will use new statistical techniques to provide information on higher spatial and temporal scales than currently available, making optimum use of the information in data-rich eras. EUSTACE will undertake this work between January 2015 and June 2018. The final and intermediate products (e.g. overview of current data sets on temperature, satellite skin temperature retrievals over all domains with consistent uncertainty estimates; station time series with discontinuities identified; information on the relationship between skin and air temperature over different domains and in different seasons) of EUSTACE will be interesting for many applications.

Differences from other surface temperature data:

- globally complete daily dataset from 1850 on
- designed in collaboration with users
- validated information on the certainty of each daily value as an integral component
- air temperature over the ocean, rather than sea surface temperature
- use information from satellites to estimate air temperature over all surfaces of Earth
- new statistical techniques to create complete pictures of air temperature everywhere

Potential users and their requirements?

To increase the usability of the EUSTACE products, we would like to involve potential users from the early start. Potential users can get involved at different levels:

- Regularly getting information on the progress and products of the project;
- Participating in user workshops or questionnaires giving feedback on requirements and preliminary products;
- As trail blazer users testing preliminary results from EUSTACE (limited number only).

Interested?

If you are interested, please send an e-mail to Janette Bessembinder (bessembi@knmi.nl).

EUSTACE has received funding from the European Union's Horizon 2020 Programme for Research and Innovation, under Grant Agreement no 640171

Science & Technology Facilities Council
University of Leicester
Met Office Hadley Centre
University of Reading
University of Bath
Universität Bern
Oeschger Centre Climate Change Research
Royal Netherlands Meteorological Institute
Ministry of Infrastructure and the Environment
DMI