

Error and uncertainties

The talks in plenary highlighted the key differences between the terms error and uncertainty. In the paragraph below, the language is ambiguous in places, typical of some scientific papers written on these subjects. Have a go at clarifying the text and distinguishing between error and uncertainty.

Error in satellite retrieval of land surface temperature has a number of different sources. We characterize error in satellite retrievals using the error distribution. Uncertainty terms can be added together to form an error budget. Error sources include instrument noise, systematic biases, and, in L3 data, sampling errors. Random uncertainty scales down as a function of $1/\sqrt{n}$ over a grid cell, whilst systematic uncertainties are highly correlated so they don't scale down over a grid cell. Sampling uncertainties arise in gridded data from some observations being unavailable due to the presence of cloud.

The paragraph below is one suggestion for how this text could be clarified. Please note that there is no single 'right answer' here and other adaptations of the text above could be equally valid.

Errors in satellite retrievals of land surface temperatures arise from a number of different sources. We characterize uncertainties in satellite retrievals by estimating the distribution of errors. Uncertainty components can be combined to form a total uncertainty. Sources of error include instrument noise, systematic effects, and, in L3 data, sampling effects. Uncertainties from random effects scale down as a function of $1/\sqrt{n}$ over a grid cell, whilst systematic errors are highly correlated so they don't average down over a grid cell. Sampling uncertainties arise in gridded data from some observations being unavailable due to the presence of cloud.