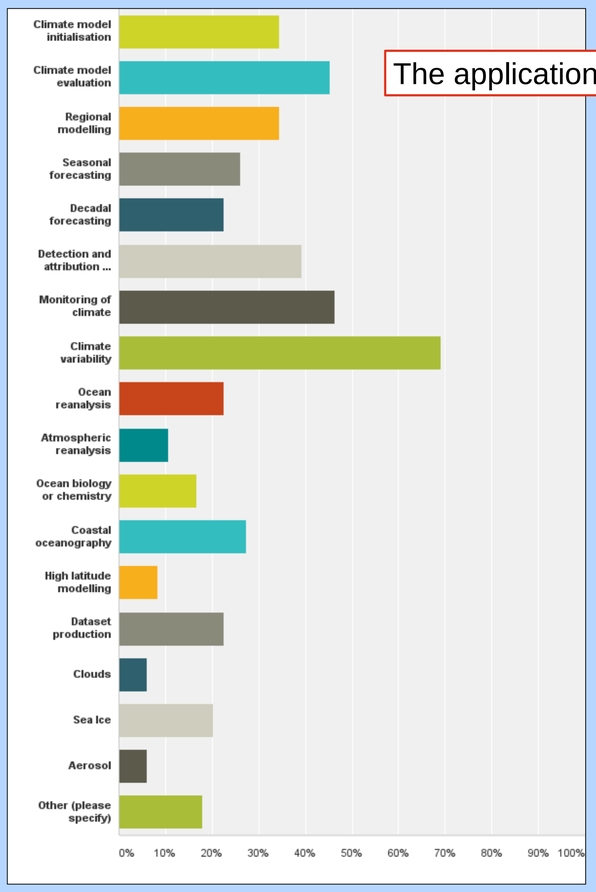
Requirements for Sea Surface Temperature data sets for Climate Research and Services

Nick Rayner, Met Office Hadley Centre, UK

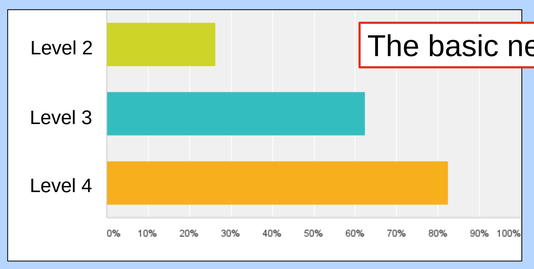
SST information is needed by almost all applications in climate research and by many climate service activities. The needs of these diverse fields are varied and can seem confusing without undertaking a systematic user requirements gathering exercise. The ESA Climate Change Initiative SST project has recently reviewed requirements for climate SST data sets from a wide range of applications in climate science and services; this updates its assessment undertaken over five years ago. Responses were received from scientists in 20 countries in North and South America, Europe, Asia, Africa and Australasia. A selected, preliminary analysis of responses is presented here; the final analysis will be presented in the updated User Requirements Document (see http://www.esa-sst-cci.org/ over the coming months).

The applications

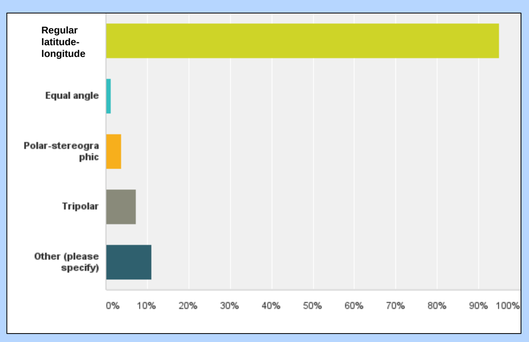


Please classify this application into one or more of the following applications/interests. Other here included: climate feedbacks; Combined historical, near real-time, and seasonal applications; air quality modelling; comparison with in-situ; interpretation and analysis of hydrographic data; fisheries; for assessing processes; atmospheric chemistry; analysis of relationship between SST and crop productivity and drought; responses of marine top predators to climate change; global numerical weather prediction and high-resolution numerical weather prediction; climate impact model evaluation; ocean heat content comparison; and calibration of proxy data.

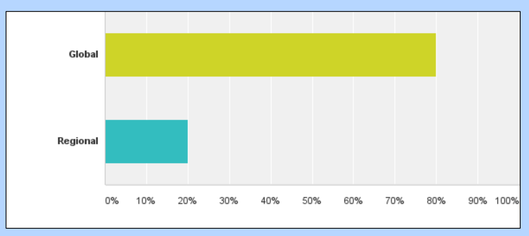
The basic needs



On what data level does the application require observations?

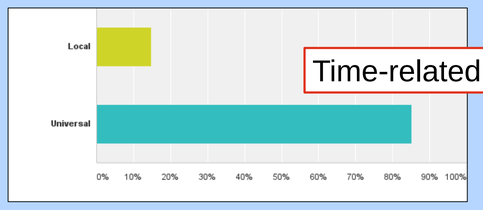


On what kind of grid would you like the data? Other here included: cubed sphere; ORCA (NEMO) grid; and equal area.



What spatial coverage is required?

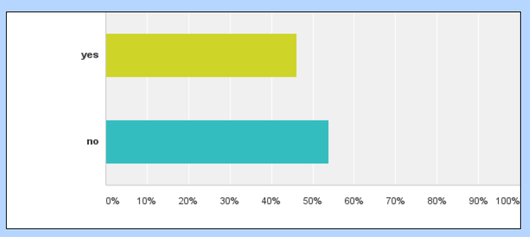
Time-related needs



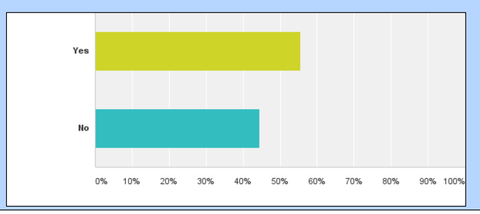
For your application, is it more useful to have all SSTs for the same local time or the same universal time?

	< 1 year	1 year	10 years	20 years	30 years	> 30 years	100 years	> 100 years
Threshold	13.85%	13.85%	13.85%	12.31%	16.92%	16.92%	3.08%	9.23%
Breakthrough	4.92%	1.64%	6.56%	4.92%	11.48%	45.90%	8.20%	16.39%
Objective	5.00%	1.67%	0.00%	6.67%	8.33%	25.00%	13.33%	40.00%

What is the temporal coverage needed for your application?

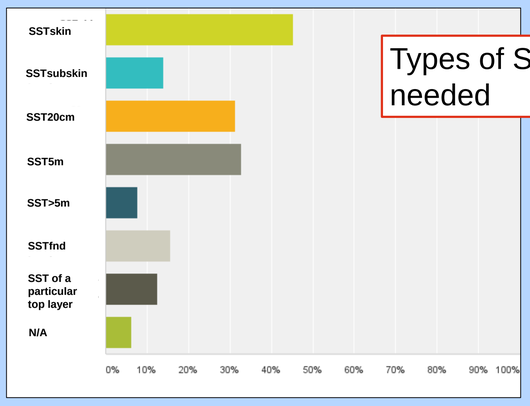


How quickly you need data: Is the concept of an interim climate record important to your application? Here respondents gave responses between less than one day and 30 days.

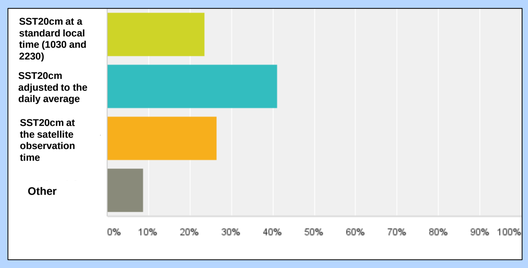


Does your application require the provision of anomalies (deviations from a long-term climatology)?

Types of SST needed

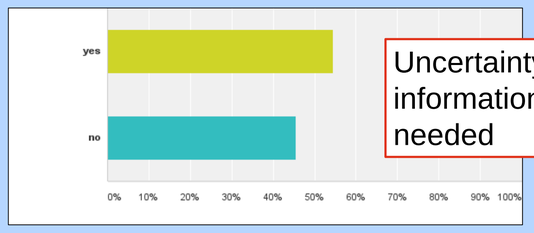


SST depth. Providers of satellite SST products variously aim to report temperatures for either the radiometric skin depth they observe or for sub-suface depths. For your application, which type(s) of SST is (are) most relevant? Other included SST1m.

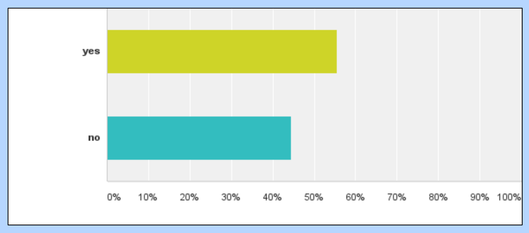


The SST CCI project will make Level 2 and Level 3C products available in a flexible format containing information enabling users to derive the SST and its uncertainty adjusted to different depths and times appropriate to their needs. We also propose to make available a standard product file which provides information in a simpler-to-use form. This standard file would contain SSTskin at the observation time, plus one other adjusted SST If you would use this, which combination of adjustments is most relevant to your application? Other here gave no specific alternatives

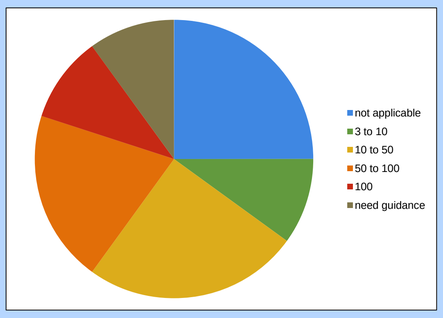
Uncertainty information needed



If SST uncertainty information were to be provided as a parametrised covariance matrix, would you use this?

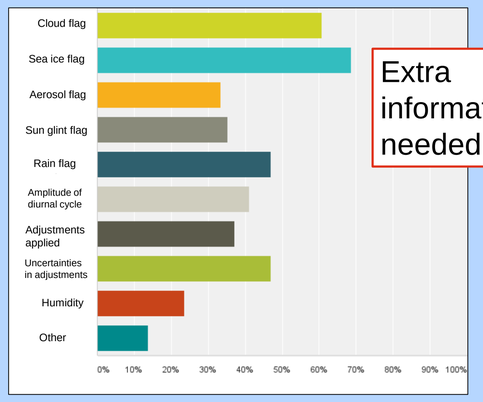


Is your application sensitive to locally-correlated errors (correlated within synoptic scales and uncorrelated beyond)?

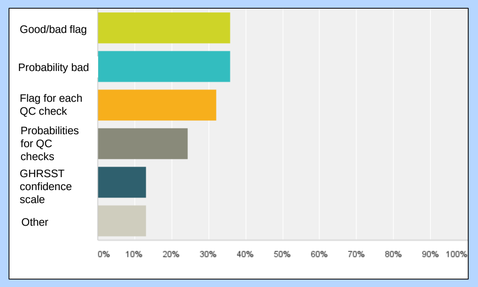


If SST uncertainty information were to be represented by an ensemble (a set of plausible realizations of each SST field which span the uncertainties in the data), what size of ensemble would you need for your application (how many members)?

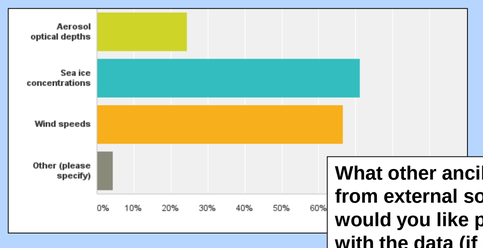
Extra information needed



What information would you like to be within the data files? Other here included: gap filled or no gap filled / how?; info on anomalously cold data; data points that may contain extreme upwelling; and information about difference w.r.t. adjacent pixels.



How would you like quality/confidence information to be communicated? Other here included requests for uncertainty information or an ensemble only and not to include flags as well.



What other ancillary data from external sources would you like provided with the data (if any)? Other here included solar radiation