Comments from Public Consultation on ECV Requirements 13/01 – 13/03 2020 for:

# Sea Surface temperature

## ECV Product: Sea surface temperature

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| **Name** | Sea surface temperature | | | | |
| **Definition** | Radiative skin sea surface temperature, or Bulk sea surface temperature at Stated depth | | | | |
| **Unit** | k | | | | |
| **Note** |  | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** | km |  | G | 1 |  |
| B |  |  |
| T | 100 |  |
| **Vertical Resolution** |  |  | G |  |  |
| B |  |  |
| T |  |  |
| **Temporal Resolution** |  |  | G | Daily  Coastal: hourly |  |
| B |  |  |
| T | Weekly |  |
| **Timeliness** |  |  | G |  |  |
| B |  |  |
| T |  |  |
| **Required Measurement Uncertainty** | k |  | G |  |  |
| B |  |  |
| T | 0.1 over 100km scales |  |
| **Stability** |  |  | G |  |  |
| B |  |  |
| T |  |  |
| **Standards and References** | ·       Johnson et al (2015): Informing Deep Argo Array Design Using Argo and Full-Depth Hydrographic Section Data; <https://journals.ametsoc.org/doi/full/10.1175/JTECH-D-15-0139.1>       ; 5 x 5 degree array proposed with 15-day repeat cycle. Estimated reduction of sub-2000 m OHC error in decadal trends from +/- 17 TW to +/- 3 TW.  ·       Palmer et al (2010): Future Observations for Monitoring Global Ocean Heat Content; <http://www.oceanobs09.net/proceedings/cwp/Palmer-OceanObs09.cwp.68.pdf>; Table 1 in the paper includes GCOS Observation Requirements in WMO/CEOS Database for upper ocean temperature and salinity  ·       Abraham et al (2013): A review of global ocean temperature observations: Implications for ocean heat content estimates and climate change; <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/rog.20022>; Review of the historical tempeature measurements and comparison of estimated rates of OHC change. I can't see any recommended sampling characteristics or sensor accuracies (based on a quick scan of the document).  ·       Desbruyeres et al (2017) : Global and Full-Depth Ocean Temperature Trends during the Early Twenty-First Century from Argo and Repeat Hydrography; <https://journals.ametsoc.org/doi/full/10.1175/JCLI-D-16-0396.1>; "Estimate of global ocean heat uptake of  0.71 ± 0.09 W m−2 during 2006-2014 with < 2000m layer accounting for 90% of the observed change. | | | | |
| **Adaptation and Extremes** | | | | | |
|  | Relevant? (Yes/No) | Sugg. Req. sufficient? (Yes/No) | Explanation | | |
| **Adaptation[2]** |  |  |  | | |
| **Extremes[3]** |  |  |  | | |

[1]Goal (G); Breakthrough (B)(not mandatory, more as one possible); Threshold (T), for definitions see [Guidelines](http://tiny.cc/ecv-review)

[2] Is the ECV Product directly relevant to support Climate Adaptation?

[3] Can the ECV Product be used to monitor climate extremes or aspects of extremes?

### Comment 1

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| Author: Chris Merchant | Email: c.j.merchant@reading.ac.uk |
| I note the additional requirement about "coastal" temporal resolution, which I agree with as a goal. But I think it implies a corresponding spatial resolution goal, since interest in river-outflow-tide interactions, etc, in the coastal zone would operate at a higher spatial resolution than 1 km in many locations. Perhaps a coastal-only resolution goal of 50 m, with breakthrough at 100m, say, would reflect the requirements of coastal zone modellers for temperature fields?  I find the required measurement uncertainty of 0.1 K over 100 km scale to be rather too severe to be classed as threshold -- clearly products have been used for many climate uses despite none of them meeting this "threshold". I agree it is desirable for open ocean, but suggest this value is rather a breakthrough level of requirement.  There is a survey on climate user requirements for SST available here:  http://www.esa-sst-cci.org/PUG/pdf/SST\_CCI-URD-UKMO-201-Issue\_2.1-signed.pdf  thanks for considering these comments  Chris Merchant | |

### Comment 2

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| Author: ECMWF | Email: ecresgcosreqs@gmail.com |
| For reanalysis and NWP requirements at ECMWF, the goal for horizontal resolution is more in the order of 5km.  Temporal resolution: goal hourly, threshold daily/weekly for NWP/reanalysis.  Timeliness goal is 3 hours, threshold 24 hours.  We agree with Chris Merchant that the uncertainty threshold of 0.1 K is too severe. For our purpose a threshold of 0.3K would be o.k., with a goal of 0.05 K.  Products should be able to quantify the observed change of ~0.18K/decade to at least 10%, i.e. a goal of 0.01-0.02 K/decade. | |

### Comment 3

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| Author: David Berry (NOC) | Email: david.inglis.berry@googlemail.com |
| It is unclear where the above requirements have come from for the threshold level. For example, the climate monitoring products, such as those produced by NOAA and the UK Met Office, would suggest a coarser resolution for the threshold level.  I have also made some comments under the near surface air temperature entry, the majority of those comments are also applicable here. | |