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

# Sea level

## ECV Product: Regional mean sea level

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | Regional mean sea level | | | | |
| **Definition** | The Height of the Ocean Surface relative to a reference geoid or an agreed regional datum | | | | |
| **Unit** | m | | | | |
| **Note** |  | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** | km |  | G | 10 |  |
| B |  |  |
| T | 100 |  |
| **Vertical Resolution** |  |  | G |  |  |
| B |  |  |
| T |  |  |
| **Temporal Resolution** |  |  | G | hourly |  |
| B |  |  |
| T | weekly |  |
| **Timeliness** |  |  | G |  |  |
| B |  |  |
| T |  |  |
| **Required Measurement Uncertainty** | mm |  | G |  |  |
| B |  |  |
| T | 10mm (over grid mesh of 50-100km) |  |
| **Stability** | mm/yr |  | G |  |  |
| B |  |  |
| T | <1 (for grid mesh of 50-100km) |  |
| **Standards and References** |  | | | | |
| **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?

NO COMMENT

## ECV Product: Global mean sea level

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | Global mean sea level | | | | |
| **Definition** | The height of the ocean surface relative to a reference Geoid | | | | |
| **Unit** | m | | | | |
| **Note** |  | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** | km |  | G | 10 |  |
| B |  |  |
| T | 100 |  |
| **Vertical Resolution** |  |  | G |  |  |
| B |  |  |
| T |  |  |
| **Temporal Resolution** |  |  | G | Weekly |  |
| B |  |  |
| T | Monthly |  |
| **Timeliness** |  |  | G |  |  |
| B |  |  |
| T |  |  |
| **Required Measurement Uncertainty** | mm |  | G |  |  |
| B |  |  |
| T | 2-4 (global mean), 10 over global mesh |  |
| **Stability** | mm/yr |  | G |  |  |
| B |  |  |
| T | <0.3 (global mean) |  |
| **Standards and References** |  | | | | |
| **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

|  |  |
| --- | --- |
| Author: Jean-François Legeais | Email: jlegeais@groupcls.com t |
| See in the original table below some suggestions of evolutions: | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | Global mean sea level | | | | |
| **Definition** | The height of the ocean surface relative to a reference Geoid | | | | |
| **Unit** | m | | | | |
| **Note** | The sea surface height above geoid is the absolute dynamic topography and is obtained by adding the Sea Level Anomalies to a Mean Dynamic Topography (static field with its own error budget). The global mean sea level reflects changes of the ocean surface due to water mass transfer from the cryosphere, atmosphere and land and due to the volume changes (thermal expansion). | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** | km | Estimates of the global mean sea level are obtained by averaging individual sea surface heights over the global ocean during a given period. | G | 10 | Global mean sea level estimates is obtained by box-averaging individual measurements or averaging gridded products and a high horizontal resolution is not required on a global scale. |
| B |  |  |
| T | 100 | Box-averaging (1°x3°) of the individual measurements |
| **Vertical Resolution** |  |  | G |  |  |
| B |  |  |
| T |  |  |
| **Temporal Resolution** | days |  | G | *Daily* | A daily temporal evolution may be enough to monitor the temporal evolution of the global mean sea level |
| B |  |  |
| T | Monthly | A monthly temporal resolution is a minimum requirement to monitor the temporal evolution of the global mean sea level |
| **Timeliness** | months |  | G | 1 month |  |
| B |  |  |
| T | 12 months |  |
| **Required Measurement Uncertainty** | mm |  | G |  |  |
| B |  |  |
| T | 2-4 (global mean), 10 over global mesh |  |
| **Stability** | mm/yr |  | G | <0.03 (per decade, 90% CI) | Target to be considered for the detection of permafrost melting. |
| B | <0.1 (per decade, 90% CI) | Target to be considered for the estimation of deep ocean warming and Earth energy imbalance |
| T | <0.3 (global mean, 90% CI) | Adapted for sea level impact detection (detection of a change in the rate of rise of the global mean sea level) |
| **Standards and References** | The error budget of the global mean sea level derived from satellite altimetry strongly relies on the precise orbit determination of the platform, the instrumental, geophysical and environmental altimeter corrections used to derive the sea level anomalies. | | | | |
| **Adaptation and Extremes** | | | | | |
|  | Relevant? (Yes/No) | Sugg. Req. sufficient? (Yes/No) | Explanation | | |
| **Adaptation[2]** | Yes | Yes | The global mean sea level reflects changes of the ocean surface due to water mass transfer from the cryosphere, atmosphere and land and due to the volume changes (thermal expansion). | | |
| **Extremes[3]** | Yes | Yes | Due to its role of integrator of the consequences of climate change, the global mean sea level is adapted to monitor climate extremes such as ENSO interannual variations. | | |

[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 2

|  |  |
| --- | --- |
| Author: ECMWF | Email: ecresgcosreqs@gmail.com |
| See below Table | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | Global mean sea level | | | | |
| **Definition** | The height of the ocean surface relative to a reference Geoid | | | | |
| **Unit** | m | | | | |
| **Note** |  | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** | km |  | G | 10 |  |
| B |  |  |
| T | 100 |  |
| **Vertical Resolution** |  |  | G |  |  |
| B |  |  |
| T |  |  |
| **Temporal Resolution** |  |  | G | Daily |  |
| B |  |  |
| T | Weekly |  |
| **Timeliness** | days |  | G | 1 |  |
| B |  |  |
| T | 30 |  |
| **Required Measurement Uncertainty** | mm |  | G |  |  |
| B |  |  |
| T | 2-4 (global mean), 10 over global mesh |  |
| **Stability** | mm/yr |  | G |  |  |
| B |  |  |
| T | <0.3 (global mean) |  |
| **Standards and References** |  | | | | |
| **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 3

|  |  |
| --- | --- |
| Author: Benoit Meyssignac | Email: benoit.meyssignac@gmail.com |
| From the WCRP grand challenge on sea level and coastal impacts the required stability in GMSL is <0.03 mm/yr per decade (90%CL) to detect permafrost thawing, <0.3 mm/yr per decade (90%CL) for the detection attribution of sea level rise. See for example Cazenave et al. 2019 Frontiers in marine science  From the WCRP GEWEX core project the required stability in GMSL is <0.1 mm/yr per decade (90%CL) to monitor the ocean heat content and the earth energy imbalance. See for example Meyssignac et al. 2019 Frontiers in marine science | |