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

# Sea state

## ECV Product: Wave height

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | Wave height | | | | |
| **Definition** | The distance between the trough of the wave and the adjacent crest of the wave. The significant wave height is the mean wave height (trough to crest) of the highest third of the waves in a wave spectrum | | | | |
| **Unit** | cm | | | | |
| **Note** |  | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** | km |  | G | 10 |  |
| B |  |  |
| T | 25 |  |
| **Vertical Resolution** |  |  | G |  |  |
| B |  |  |
| T |  |  |
| **Temporal Resolution** | hour |  | G | 1 |  |
| B |  |  |
| T | 3 |  |
| **Timeliness** |  |  | G |  |  |
| B |  |  |
| T |  |  |
| **Required Measurement Uncertainty** | cm |  | G |  |  |
| B |  |  |
| T | 10 |  |
| **Stability** | cm |  | G |  |  |
| B |  |  |
| T | 5 |  |
| **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: ECMWF | Email: ecresgcosreqs@gmail.com |
| A similar response will come from the sea state CCI group. It is here slightly altered to reflect my view on the subject  See below Table. | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |
| Name | Significant wave height | | | | |
| Definition | 4 times the standard deviation of the sea surface elevation | | | | |
| Unit | m | | | | |
| Note | The significant wave height is roughly equivalent to the visual estimate of a given sea state made by an observer, derived as the mean highest third of individual wave heights (from crest to trough). | | | | |
|  | Usual notations are Hs or Hm0 |  |  |  |  |
| Requirement | | | | | |
| Item needed | Unit | Metric | [1] | Value | Derivation and References and Standards |
| Horizontal resolution | km |  | G | 1 | Needed to resolve sea state variability in the coastal zone |
|  |  |  | B | 25 | Needed to resolve mesoscale variability |
|  |  |  | T | 100 | Needed to resolve synoptic scales associated with atmospheric systems |
| Vertical resolution | N/A |  | G |  |  |
|  |  |  | B |  |  |
|  |  |  | T |  |  |
| Temporal resolution | hour |  | G | 1 | Needed to resolve sea state variability in the coastal zone (tidal modulation of the sea state) |
|  |  |  | B | 3 | Needed to resolve sea state variability at the scale of storm events |
|  |  |  | T | 24 | Needed to compute robust monthly statistics |
| Timeliness | days |  | G | 7 | To support assessment of extreme storm/cyclonic event |
|  |  |  | B | 30 | To support assessment of seasonal extreme event |
|  |  |  | T | 365 | For assessment and reanalysis |
| Required Measurement Uncertainty | % | Normalized root-mean-squared error | G | 5 | Uncertainty goal, as proposed by Ardhuin et al., 2019 |
|  |  |  | B |  |  |
|  |  |  | T |  |  |
| Stability | cm/decade |  | G | 1 | Needed to account for wave impact (wave setup) on coastal sea level |
|  |  |  | B |  |  |
|  |  |  | T | 10 | Needed to detect the largest trends. Existing long-term observations show maximum |
|  |  |  |  |  | trends of the order of ~20 cm/decade |
| Standards and References | Ardhuin, F. et al. 2019. Observing Sea States. Front. Mar. Sci. 6. | | | | |
| Adaptation and Extremes | | | | | |
|  | Relevant (Yes/No)? | Sugg. Req. sufficient (Yes/No) | Explanation | | |
| Adaptation[2] | Yes | Yes | Increasing Hs may accelerate coastal erosion and enhance SLR impact. Long-term records are needed to design coastal defence and infrastructure | | |
| Extreme[2] | Yes | Yes | Extreme wave height impact marine safety, shipping routes, offshore platforms, coastal areas. High-resolution data is needed to mitigate flood risks. | | |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
| Name | Mean wave period Tm02 | | | | |
| Definition | Square root of the ratio of the zeroth order spectral moment to the second order spectral moment. Tm02 is roughly equal to the mean period computed in the time domain (zero-crossing) | | | | |
| Unit | s | | | | |
| Note | Ideally the spectral range over which the spectral moments are computed should also be specified as Tm02 is quite sensitive to it. | | | | |
|  |  |  |  |  |  |
| Requirement | | | | | |
| Item needed | Unit | Metric | [1] | Value | Derivation and References and Standards |
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|  |  |  | T | 100 | Needed to resolve synoptic scales associated with atmospheric systems |
| Vertical resolution | N/A |  | G |  |  |
|  |  |  | B |  |  |
|  |  |  | T |  |  |
| Temporal resolution | hour |  | G | 1 | Needed to resolve sea state variability in the coastal zone (tidal modulation of the sea state) |
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|  |  |  | B | 30 | To support assessment of seasonal extreme event |
|  |  |  | T | 365 | For assessment and reanlysis |
| Required Measurement Uncertainty | s | Normalized root-mean-squared error | G | 0.2 | Uncertainty goal, as proposed by Ardhuin et al., 2019 |
|  |  |  | B |  |  |
|  |  |  | T |  |  |
| Stability | s/decade |  | G | 0.1 | Uncertainty goal, as proposed by Ardhuin et al., 2019 |
|  |  |  | B |  |  |
|  |  |  | T |  |  |
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| Adaptation[2] |  |  |  | | |
| Extreme[2] |  |  |  | | |
|  |  |  |  |  |  |

### Comment 2

|  |  |
| --- | --- |
| Author: Guillaume Dodet | Email: guillaume.dodet@ifremer.fr |
| Here is the original version, reviewed by the Sea State CCI | |

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|  |  |  | T | 365 | For assessment and reanalysis |
| Required Measurement Uncertainty | % | Normalized root-mean-squared error | G | 5 | Uncertainty goal, as proposed by Ardhuin et al., 2019 |
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| Required Measurement Uncertainty | s | Normalized root-mean-squared error | G | 0.2 | Uncertainty goal, as proposed by Ardhuin et al., 2019 |
|  |  |  | B |  |  |
|  |  |  | T |  |  |
| Stability | s/decade |  | G | 0.1 | Uncertainty goal, as proposed by Ardhuin et al., 2019 |
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