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

# Surface radiation budget

## ECV Product: Upward Long-Wave Irradiance at Earth Surface

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | Upward Long-Wave Irradiance at Earth Surface | | | | |
| **Definition** | Flux density of terrestrial radiation emitted by the Earth surface | | | | |
| **Unit** | W/m² | | | | |
| **Note** | 1.                    Main issue is the composition of the atmosphere (e.g. Water vapour profile, cloud bottom height)  2.                    The required measurement Uncertainty (see the VIM & GUM) includes both random and systematic components  3.                    The uncertainty is meant to be an uncertainty for the measurement device / instrument / ECV algorithm. The uncertainty of spatially and temporally averaged global mean value might be smaller. | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** | km |  | G | 50 |  |
| B | 250 |  |
| T | 1000 |  |
| **Vertical Resolution** | N/A |  | G | N/A | N/A |
| B | N/A | N/A |
| T | N/A | N/A |
| **Temporal Resolution** | hr |  | G | 1 |  |
| B | 24 |  |
| T | 720 |  |
| **Timeliness** | days |  | G |  | 1 month after complete year |
| B |  |  |
| T |  |  |
| **Required Measurement Uncertainty** | W/m2 |  | G | 1 |  |
| B | 5 |  |
| T | 10 |  |
| **Stability** | W/m2/decade |  | G | 0.2 |  |
| B | 0.5 |  |
| T | 1 |  |
| **Standards and References** |  | | | | |
| **Adaptation and Extremes** | | | | | |
|  | Relevant? (Yes/No) | Sugg. Req. sufficient? (Yes/No) | Explanation | | |
| **Adaptation[2]** |  |  | Reviewers are invited to suggest answers for these fields | | |
| **Extremes[3]** |  |  | Reviewers are invited to suggest answers for these fields | | |

[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 |
| It seems to be very difficult to trully measure this over large areas; it can be measured at point sites but then one is subject to the local conditions at the site (although there are global estimates combining surface point measurements and models, e.g. Wild et al. https://link.springer.com/content/pdf/10.1007/s00382-014-2430-z.pdf). Any broadband radiometric measurements more than a few 10s of metres above the surface will see a large amount atmospheric emission due to the opacity of the atmosphere in most of the longwave spectrum. It seems to me a more practical approach to measure the surface temperature using radiometric measurements in the infrared window (which you have an ECV for) and couple this to knowledge of the surface spectral emissivity. Alas I can't find an ECV for spectral emissivity but it is important and quite wrong in many models (see Feldman et al. https://www.pnas.org/content/pnas/111/46/16297.full.pdf). (Robin Hogan, ECMWF.) | |

## ECV Product: Downward Long-Wave Irradiance at Earth Surface

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | Downward Long-Wave Irradiance at Earth Surface | | | | |
| **Definition** | Flux density of radiation emitted by the gases, aerosols and clouds of the atmosphere to the Earth's surface | | | | |
| **Unit** | W/m² | | | | |
| **Note** | 1.                    Main issue is the composition of the atmosphere (e.g. Water vapour profile, cloud bottom height)  2.                    The required measurement Uncertainty (see the VIM & GUM) includes both random and systematic components  3.                    The uncertainty is meant to be an uncertainty for the measurement device / instrument / ECV algorithm. The uncertainty of spatially and temporally averaged global mean value might be smaller. | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** | km |  | G | 50 |  |
| B | 250 |  |
| T | 1000 |  |
| **Vertical Resolution** | N/A |  | G | N/A | N/A |
| B | N/A | N/A |
| T | N/A | N/A |
| **Temporal Resolution** | hr |  | G | 1 |  |
| B | 24 |  |
| T | 720 |  |
| **Timeliness** | days |  | G |  | 1 month after the observations period |
| B |  |  |
| T |  |  |
| **Required Measurement Uncertainty** | W/m2 |  | G | 1 |  |
| B | 5 |  |
| T | 10 |  |
| **Stability** | W/m2/decade |  | G | 0.2 |  |
| B | 0.5 |  |
| T | 1 |  |
| **Standards and References** |  | | | | |
| **Adaptation and Extremes** | | | | | |
|  | Relevant? (Yes/No) | Sugg. Req. sufficient? (Yes/No) | Explanation | | |
| **Adaptation[2]** |  |  | Reviewers are invited to suggest answers for these fields | | |
| **Extremes[3]** |  |  | Reviewers are invited to suggest answers for these fields | | |

[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: Downward Short-Wave Irradiance at Earth Surface

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | Downward Short-Wave Irradiance at Earth Surface | | | | |
| **Definition** | Flux density of the solar radiation at the Earth surface | | | | |
| **Unit** | W/m² | | | | |
| **Note** | 1.                    Main issue is the composition of the atmosphere (e.g. Water vapour profile, cloud bottom height)  2.                    The required measurement Uncertainty (see the VIM & GUM) includes both random and systematic components  3.                    The uncertainty is meant to be an uncertainty for the measurement device / instrument / ECV algorithm. The uncertainty of spatially and temporally averaged global mean value might be smaller. | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** | km |  | G | 50 |  |
| B | 250 |  |
| T | 1000 |  |
| **Vertical Resolution** | N/A |  | G | N/A | N/A |
| B | N/A | N/A |
| T | N/A | N/A |
| **Temporal Resolution** | hr |  | G | 1 |  |
| B | 24 |  |
| T | 720 |  |
| **Timeliness** | days |  | G |  | 1 month after complete year |
| B |  |  |
| T |  |  |
| **Required Measurement Uncertainty** | W/m2 |  | G | 1 |  |
| B | 5 |  |
| T | 10 |  |
| **Stability** | W/m2/decade |  | G | 0.2 |  |
| B | 0.5 |  |
| T | 1 |  |
| **Standards and References** |  | | | | |
| **Adaptation and Extremes** | | | | | |
|  | Relevant? (Yes/No) | Sugg. Req. sufficient? (Yes/No) | Explanation | | |
| **Adaptation[2]** |  |  | Reviewers are invited to suggest answers for these fields | | |
| **Extremes[3]** |  |  | Reviewers are invited to suggest answers for these fields | | |

[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