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

# River Discharge

## ECV Product: Water level

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| --- | --- | --- | --- | --- | --- |
| **Name** | Water level | | | | |
| **Definition** | Water level is the elevation of the surface of a river or a lake, reservoir regarding a reference (the ellipsoid). | | | | |
| **Unit** | m | | | | |
| **Note** |  | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** | m |  | G | Rivers >20- | In addition to global and regional hydrological data, measurement of least anthropogenic impacted basins to derive changes in rainfall distribution, intensity and determine climate signals. |
| B | Rivers >20-50m | Measurement of changes in seasonal level patterns at regional level. |
| T | Rivers >50m |  |
| **Vertical Resolution** | N/A |  | G |  |  |
| B |  |  |
| T |  |  |
| **Temporal Resolution** |  |  | G | Hourly | Required to monitor single events and for assessment of extreme events |
| B | Daily | Suitable to determine general river/lakes patterns at regional and global scales |
| T | Monthly | -Suitable to support climate related modelling of terrestrial, oceanographic and atmospheric systems |
| **Timeliness** |  |  | G | Daily | For high resolution studies and for preparedness, mitigation during short term events |
| B | Monthly | Regional forecasting and modelling |
| T | Yearly | For climatology the provision of monthly data within one year after data collection is necessary |
| **Required Measurement Uncertainty** | cm |  | G | 10 |  |
| B | 10 |  |
| T | 10 |  |
| **Stability** | m/yr | Maximum drift over reference period | G | 0.01 | For high resolution climatology and necessary to validate variability and extremes |
| B | 0.01 |  |
| T | 0.05 | For climatologies |
| **Standards and References** | WMO Technical Regulations of Hydrology (WMO-No.49) and Guide to hydrological practices (WMO-No.168)  ISO 1100-1 (1996) Measurement of liquid flow in open channels-Part I: Establishment and operation of a gauging station  ISO 748 (1997) Measurement of liquid flow in open channels-Velocity area methods  WMO (WMO-519) Manual on stream gauging Volume I-Fieldwork and Volume II-Computation of discharge  ISO Technical Committee 113 is dealing with all standards related to Hydrometry  ISO/TS 24154 (2005) The principles of operation, construction, maintenance and application of acoustic Doppler current profilers (ADCP) | | | | |
| **Adaptation and Extremes** | | | | | |
|  | Relevant? (Yes/No) | Sugg. Req. sufficient? (Yes/No) | Explanation | | |
| **Adaptation[2]** | Yes | Yes | For adaptation water level can be used to adjust the design infrastructure (reservoirs, bridges, weirs etc.), to establish effects of changes in elevation behavior (e.g. irrigation areas, navigability of rivers, hydro-power production, water supply to end-users), to establish links between water quality vs elevation (health hazard, biodiversity, carbon cycle of lakes, etc.) | | |
| **Extremes[3]** | Yes | Yes | Measurement of minimum and maximum elevation. Determination of changes in the occurrence of extremes. | | |

[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: ECMWF | Email: ecresgcosreqs@gmail.com |
| Agree with the suggestions posted on water level | |

## ECV Product: River Discharge

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| --- | --- | --- | --- | --- | --- |
| **Name** | River Discharge | | | | |
| **Definition** | River discharge is defined as the volume of water passing a measuring point or gauging station in a river in a given time. For station calibration both, the flow velocity and the cross-sectional area has to be measured a few times a year. River-discharge measurements have essential direct applications for water management and related services, including flood protection. They are needed in the longer term to help identify and adapt to some of the most significant potential effects of climate change. The flow of freshwater from rivers into the oceans also needs to be monitored because it reduces ocean salinity, and changes in flow may thereby influence the thermohaline circulation. | | | | |
| **Unit** | m3/s | | | | |
| **Note** |  | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** |  |  | G | 4,000 stations | In addition to global and regional hydrological data, measurement of least anthropogenic impacted basins to derive changes in rainfall distribution, intensity and determine climate signals. |
| B | 1,400 stations | Measurement of changes in seasonal discharge patterns at regional level. |
| T | 600 stations globally | Major rivers along the continental fringes to capture the freshwater influx to the oceans which has an impact on ocean temperature and salinity which in turn has impacts on ocean currents and weather systems. |
| **Vertical Resolution** | N/A |  | G |  |  |
| B |  |  |
| T |  |  |
| **Temporal Resolution** |  |  | G | Hourly | Required to monitor single events and for assessment of extreme events |
| B | Daily | Suitable to determine general discharge patterns at regional and global scales |
| T | Monthly | -Suitable to support climate related modelling of terrestrial, oceanographic and atmospheric systems |
| **Timeliness** |  |  | G | Daily | For high resolution studies and for preparedness, mitigation during short term events |
| B | Monthly | Regional forecasting and modelling |
| T | Yearly | For climatology the provision of monthly data within one year after data collection is necessary |
| **Required Measurement Uncertainty** | % | relative | G | 5 | Improved measurement techniques and sufficient resources |
| B | 10 |  |
| T | 15 | Discharge measurements are affected by a number of changing conditions and uncertainties due to complex calibration needs such as river cross section flow velocities, changing channel conditions, siltation, scour, weed growth, ice conditions |
| **Stability** | m/yr | Maximum drift over reference period | G | 0.01 | For high resolution climatology and necessary to validate discharge variability and extremes |
| B | 0.05 |  |
| T | 0.1 | For climatologies |
| **Standards and References** | WMO Technical Regulations of Hydrology (WMO-No.49) and Guide to hydrological practices (WMO-No.168)  ISO 1100-1 (1996) Measurement of liquid flow in open channels-Part I: Establishment and operation of a gauging station  ISO 748 (1997) Measurement of liquid flow in open channels-Velocity area methods  WMO (WMO-519) Manual on stream gauging Volume I-Fieldwork and Volume II-Computation of discharge  ISO Technical Committee 113 is dealing with all standards related to Hydrometry  ISO/TS 24154 (2005) The principles of operation, construction, maintenance and application of acoustic Doppler current profilers (ADCP) | | | | |
| **Adaptation and Extremes** | | | | | |
|  | Relevant? (Yes/No) | Sugg. Req. sufficient? (Yes/No) | Explanation | | |
| **Adaptation[2]** | Yes | Yes | For adaptation river discharge can be used to adjust the design infrastructure (reservoirs, bridges, weirs etc.), to determine flood prone areas, to establish effects of changes in discharge behavior (e.g. irrigation areas, navigability of rivers, hydro-power production, water supply to end-users). | | |
| **Extremes[3]** | Yes | Yes | Measurement of maximum discharge for planning purposes and determination of prolonged low flow/drought periods. Determination of changes in the occurrence of extremes. | | |

[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?

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### Comment 1

|  |  |
| --- | --- |
| Author: MRI Scnatweb | Email: mountainresearchinitiative@gmail.com |
| In mountain context river discharge is Important for run off, <500, resolution needed with daily to sub daily measurements  Not enough in-situ data especially for head-waters. Glaciers and permafrost not well presented in the models.  Based on discussions and preliminary outcomes of the GEO GNOME workshop for identifying ECVs to monitor and understand mountain climate change. More information on the workshop here: LINK. | |

### Comment 2

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| Author: ECMWF | Email: ecresgcosreqs@gmail.com |
| Seee below Table and Comments | |

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| **Unit** | m3/s | | | | |
| **Note** |  | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** |  |  | G | 20,000 stations | In addition to global and regional hydrological data, measurement of least anthropogenic impacted basins to derive changes in rainfall distribution, intensity and determine climate signals.  Comment: due to great spatial variability, 4,000 point measurements would not be sufficient to understand changes and variability |
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|  |
| B | 1,400 stations | Measurement of changes in seasonal discharge patterns at regional level. |
| T | 6000 stations globally | Major rivers along the continental fringes to capture the freshwater influx to the oceans which has an impact on ocean temperature and salinity which in turn has impacts on ocean currents and weather systems.Comments: measurements along river of large watershed critically important to understand hydrological cycle |
| **Vertical Resolution** | N/A |  | G |  |  |
| B |  |  |
| T |  |  |
| **Temporal Resolution** |  |  | G | Hourly | Required to monitor single events and for assessment of extreme events |
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