

climate change initiative

RIVER DISCHARGE

CCI River Discharge User Requirements



river
discharge
cci



User Workshop
Météo-France, Toulouse
03-04 June 2024



Purpose and method



- Purpose: collect user requirements on climate-oriented river discharge product
- Requirements collected from key climate experts/users based only on interviews of a limited number of users
- 23 users contacted covering a wide range of activities:
 - CCI projects: CMUG, Sea Level Budget Closure, Sea Level, Lakes, Ocean Color, Sea Surface Salinity, Sea Surface Temperature, Soil Moisture
 - Hydrology modelers/assimilation
 - GRDC, GCOS, GEWEX
 - Mountain hydrology
 - Stakeholder
- Results: oral interview from 10 persons + written feedbacks from 7 persons/teams btw February and April 2023
- User Requirements Document (URD) available online: https://climate.esa.int/media/documents/D1_CCI-Discharge-0003-URD.pdf



Document used



- GCOS ECV requirements for river discharge (updated in 2022):

Requirements					
Item needed	Unit	Metric	[1]	Value	Notes
Horizontal Resolution			G	-	N/A. In situ observation by a point measurement on gauge.
			B	-	
			T	-	
Vertical Resolution			G	-	N/A
			B	-	
			T	-	
Temporal Resolution	h		G	1	Hourly. Required to monitor single events and for assessment of extreme events.
			B	24	Daily. Suitable to determine general discharge patterns at regional and global scales
			T	720	Monthly. Suitable to support climate related modelling of terrestrial, oceanographic and atmospheric systems
Timeliness	month		G	1 (day)	Daily. For high resolution studies and for preparedness, mitigation during short term events
			B	1	Monthly. Regional forecasting and modelling
			T	12	Yearly. For climatology the provision of monthly data within one year after data collection is necessary
Required Measurement Uncertainty (2-sigma)	%		G	5	Improved measurement techniques and sufficient resources
			B	10	
			T	15	
Stability	m y ⁻¹ / decade	Maximum drift over reference period	G	0.01	For high resolution climatology, necessary to validate discharge variability and extremes.
			B	0.05	
			T	0.1	For climatology

See:
<https://gcos.wmo.int/en/essential-climate-variables/about/requirements>



Requirements for the CCI River Discharge Precursor project (1/2)



- **Geophysical measurement:** river discharge in m³/s
- **Time step threshold:** products will be delivered at EO observation sampling dates (in UTC time)
- **Time step goal:** monthly average time series product will be delivered and daily (but not daily average) time series product
- **Time span threshold:** 20 years' time series (from 2002-2022)
- **Time span goal:** time series from 1995-2022
- **River basin coverage threshold:** at least 15 river basins, covering different climatic zones, latitudes and level of anthropization, and should include both exorheic and endorheic basins. It should be representative of the global situation, excluding mountain basins
- **River basin coverage goal:** observing all basins at global scale with drainage area above multiple 10,000 km²
- **Locations threshold:** multiple locations shall be provided per basins. For each basin, the estimation of discharge near the outlet on river reach not affected by tides (which could be multiple hundreds of km upstream) will be considered. Within all locations from all basins, locations shall cover different drainage area, from multiple 10,000 km² to near the Amazon outlet. Mountain (sub-)basins shall be excluded



Requirements for the CCI River Discharge Precursor project (2/2)



- **Uncertainty threshold:** It shall be provided based on comparison with in situ measurements, if available and shall at least be mission dependent
- **Uncertainty goal:** having uncertainty around 15% on monthly average discharge product
- **Ancillary data threshold:** gauge coordinates (longitude/latitude), drainage area, river name/information to locate river on which discharge is computed
- **Ancillary data goal:** gauge coordinates (longitude/latitude), drainage area, river name/information to locate river on which discharge is computed, altitude, mean river width and water elevation



Conclusion



- User requirements could be updated at the end of the project (July/September 2024)
- User requirements will be discussed to have your feedbacks and to update Tuesday at 10am





river discharge cci

climate.esa.int/projects/river-discharge

