(a)		
Inputs (dataset)	[ME] Method Applied (dataset)	GHI Outputs
	[QC] Quality Control Measures (dataset)	GIS Data
Station metadata (CWC-21)	[ME] Compile station information (CWC-21)	- [Layer 1] Composite river
	[QC] Compare station lat/long(WRIS-OL)	basins;
	[ME] Relocate stations on to river network (HvdroSHEDS and	- [Layer 2] station metadata (station raw locations, relocated
	MERIT)	locations, landmarks, other
	[QC] Use online maps to verify station locations, add landmarks	attributes);
	(Google Maps, OpenStreetMap)	- [Layer 3] station-specific
Hydrography (HydroSHEDS)	[ME] Delineate major basin boundaries (HydroSHEDS)	catchment boundaries, station- specific river networks
	[QC] Compare with other basin boundaries (WRIS-GIS)	
		Tabular Data
	[ME] Delineate station-wise catchment boundaries and river networks (HydroSHEDS)	- station metadata (station raw locations, relocated locations,
	[QC] Compare with other river networks (Lin et al., 2021)	landmarks, other attributes);
	[QC] Compare with other river networks (Google Maps,	- monthly/annual time series
	OpenStreetMap)	(observed streamflow, precipitation, ET, runoff)
	[ME] Estimate catchment area (HydroSHEDS)	precipitation, E1, runon)
	[QC] Compare with other catchment area estimates (MERIT)	
		Graphics
Observed streamflow (WRIS-OL)	[ME] Compile monthly/annual streamflow time series (WRIS-OL)	- station-wise maps; - station-wise time series charts
	[QC] Compare with compiled streamflow (CWC-YB, CWC-19)	
Precipitation (IMD)	[ME] GIS mapping of gridded datasets to catchment boundaries	
······	to generate dataset-specific interpolation masks; Compile grid-	
Precipitation, ET and runoff	area-weighted monthly/annual hydrometeorological time series	
(ERA5-Land)	(IMD, ERA5-Land, GLEAM) [QC] Compare with compiled precipitation (CWC-19)	
ET (GLEAM)	[QC] Analyze catchment annual water balance	

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(b)

GIS layer 1: Composite Hydrologic Regions

Major river basins based on HydroSHEDS; make boundaries consistent with WRIS boundaries

GIS layer 2: Streamflow Stations

Verify station locations; add reference landmarks

Relocate stations on to HydroSHEDS river network and MERIT Hydro network

GIS layer 3: Station-specific Upstream Catchment Boundary & River Network

Identify upstream catchment area boundary and river network for each station

Calculate catchment areas

Observed Streamflow Data

Compile monthly and annual time series from daily data; check for missing data (see Section 3.4)

Station Categorization Analysis

See Figure 7;

Categorize stations into Group 1, Group 2 and Group 3

Compile Time Series Data

Gridded data: identify grids falling within catchment boundary of each station

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Hydrometeorological data: estimate grid-area-weighted precip., ET and runoff for each catchment; add observed streamflow data; generate monthly and annual time series

GHI final product

series data

Plain-text files: station metadata, hydrometeorological time

Shapefiles (GIS): Composite river basins, station metadata (station raw locations, relocated locations, landmarks, other attributes), station-specific catchment boundaries and station-specific river networks

PDF files: one-page summary graphic on each station; monthly and annual summaries