

## GTN-H Data Products

(Balazs Fekete, 20<sup>th</sup> April 2008)

GTN-H data products were designed to support wide range of water resources management applications by combining a large variety of available water relevant data from GTN-H partners and processing them in a comprehensive modeling and data assimilation framework. The three core application areas are 1.) 20<sup>th</sup> Century Seasonal Hydrography (1901-2002, Monthly), 2.) Multi-decadal Analysis (1950-2002 Daily) and 3.) Near realtime Monitoring (1998-Present Daily). Each application area consists of a number of hydrological simulations and data assimilation with different forcing data and model configuration. Along the estimated components of the water cycle (evapotranspiration, soil moisture, groundwater content, surface runoff, subsurface runoff, total runoff, river discharge) the relevant statistics (e.g. minimum, maximum, standard deviations, exceedance probability, etc.) are also provided. All the products are produced initially at 30' (longitude × latitude) spatial resolution. The Data Products are organized along the following product maps:

### **1901-2002 Monthly**

The 20<sup>th</sup> Century Seasonal hydrology is based on two different one hundred year climate forcings (air temperature and precipitation) from the Climate Research Unit of University of East Anglia [4] and from University of Delaware<sup>1</sup>. The Water Balance Model was configured with Hamon [2,1] potential evapotranspiration function combined with Water Transport Model applying Musking method. Two versions of the model simulations are provided. The “*pristine*” runs only consider natural vegetation and does not account for any human activities altering the water cycle. The “*disturbed*” simulations incorporate water uptakes for irrigation from various water sources (small reservoirs, local groundwater, nearby river channel and unsustainable sources) and the water transport component simulates reservoir operations. For each model combination (CRU pristine, CRU disturbed, UDelaware pristine, UDelaware disturbed) the following water cycle variables are provided:

Evapotranspiration	[mm/mo]
Soil Moisture	[mm]
Groundwater content	[mm]
Surface runoff	[mm/mo]
Subsurface runoff	[mm/mo]
Total runoff	[mm/mo]
Simulated Discharge	[m <sup>3</sup> /s]

### **1950-2002 Daily**

The daily data products are developed as a combination of monthly air temperature and precipitation data from CRU and UDelaware (as the 1901-2002 Monthly products) complemented by the gridded monthly precipitation estimates from Global Precipitation Climatology Centre's Variability Analysis of Surface Climate Observations (VASClimO)<sup>2</sup> combined with NCEP reanalysis [3]. The NCEP air temperature and precipitation values are aggregated to daily anomalies and monthly precipitation fractions respectively and are applied against the CRU, UDelaware and VASClimO monthly values. The model configurations follow the same logic as the 1901-2002 Monthly products (CRU-NCEP pristine, CRU-NCEP disturbed, UDelaware-NCEP pristine, UDelaware-NCEP disturbed, CRU-VASClimO-NCEP pristine, CRU-VASClimO-NCEP disturbed), where the CRU-VASClimO-NCEP combinations use CRU air temperature and VASClimO monthly

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1 <http://climate.geog.udel.edu/~climate>

2 <http://gpcc.dwd.de>

precipitation. The produced variables are identical to the 1901-2002 Monthly products.

### **1998-Present Daily**

The near realtime 1998-Present Daily products utilize a combination of the Global Precipitation Climate Project (GPCP) 1 degree daily products<sup>3</sup> combined with the Tropical Rainfall Measuring Mission's (TRMM)<sup>4</sup> quarter degree, and three hourly 3B42v6 product which is aggregated to daily rainrates and half degree resolutions. Since, the TRMM precipitation data only covers the tropics between 50 degree South to 50 degree North, the missing high latitude precipitation estimates are merged from the coarser resolution GPCP 1 degree daily products.

### **Product Map**

The listed products are organized in the following menu structure:

#### 1901-2002 Monthly

##### CRU pristine

- Evapotranspiration
- Soil Moisture
- Groundwater content
- Surface runoff
- Subsurface runoff
- Total runoff
- Simulated Discharge

##### CRU disturbed

- Evapotranspiration
- Soil Moisture
- Groundwater content
- Surface runoff
- Subsurface runoff
- Total runoff
- Simulated Discharge

##### UDelaware pristine

- Evapotranspiration
- Soil Moisture
- Groundwater content
- Surface runoff
- Subsurface runoff
- Total runoff
- Simulated Discharge

##### UDelaware disturbed

- Evapotranspiration
- Soil Moisture
- Groundwater content
- Surface runoff
- Subsurface runoff
- Total runoff
- Simulated Discharge

#### 1950-2002 Daily

##### CRU-NCEP pristine

- Evapotranspiration
- Soil Moisture
- Groundwater content
- Surface runoff
- Subsurface runoff
- Total runoff
- Simulated Discharge

##### CRU-NCEP disturbed

- Evapotranspiration
- Soil Moisture

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<sup>3</sup> <http://precip.gsfc.nasa.gov>

<sup>4</sup> <http://trmm.gsfc.nasa.gov>

- Groundwater content
- Surface runoff
- Subsurface runoff
- Total runoff
- Simulated Discharge
- UDelaware-NCEP pristine
  - Evapotranspiration
  - Soil Moisture
  - Groundwater content
  - Surface runoff
  - Subsurface runoff
  - Total runoff
  - Simulated Discharge
- UDelaware-NCEP disturbed
  - Evapotranspiration
  - Soil Moisture
  - Groundwater content
  - Surface runoff
  - Subsurface runoff
  - Total runoff
  - Simulated Discharge
- CRU-VASClimO-NCEP pristine
  - Evapotranspiration
  - Soil Moisture
  - Groundwater content
  - Surface runoff
  - Subsurface runoff
  - Total runoff
  - Simulated Discharge
- CRU-VASClimO-NCEP disturbed
  - Evapotranspiration
  - Soil Moisture
  - Groundwater content
  - Surface runoff
  - Subsurface runoff
  - Total runoff
  - Simulated Discharge

1998-Present Daily

- GPCP1dd-TRMM3B42v6-NCEP pristine
  - Evapotranspiration
  - Soil Moisture
  - Groundwater content
  - Surface runoff
  - Subsurface runoff
  - Total runoff
  - Simulated Discharge
- GPCP1dd-TRMM3B42v6-NCEP disturbed
  - Evapotranspiration
  - Soil Moisture
  - Groundwater content
  - Surface runoff
  - Subsurface runoff
  - Total runoff
  - Simulated Discharge

Under each variable, further four menu option provides access to the:

- Time Series
- Relative Value
- Minimum
- Maximum
- Standard Deviations
- Exceedance probability

## Reference

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