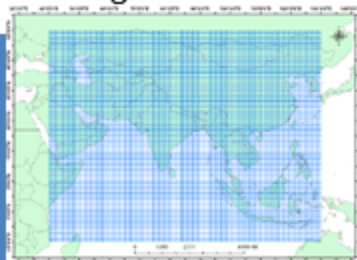


# In-House R & D: Hydrological Modelling Over Indian Monsoon Region using Variable Infiltration Capacity Model

**OBJECTIVES :** Generate high resolution land surface parameter dataset for the Indian Monsoon region.

## INPUTS

- ❖ **Meteorological Forcing :** (NCEP)
  - Daily Rainfall
  - Daily Temp (Max, Min)
  - Daily Wind Speed
- ❖ **Vegetation Parameters**
  - Land Use Land Cover Map (GLCF, 2000)
  - Vegetation Parameters (GLDAS)
- ❖ **Soil Parameters**
  - Soil Texture (FAO)
  - Soil Properties (FAO)
- ❖ **Topographical Parameters**
  - GTOPO (30 arc sec/Hydro 1k)



**Model- VIC**

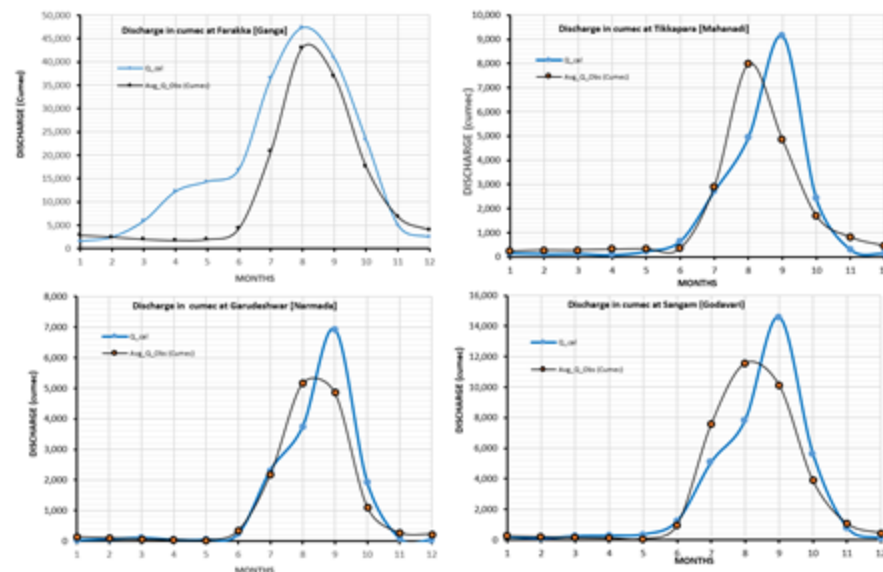
**Model Run : 1977-2006**

**Time Step : 8 hrs.**

**GRID Size : 0.25°**

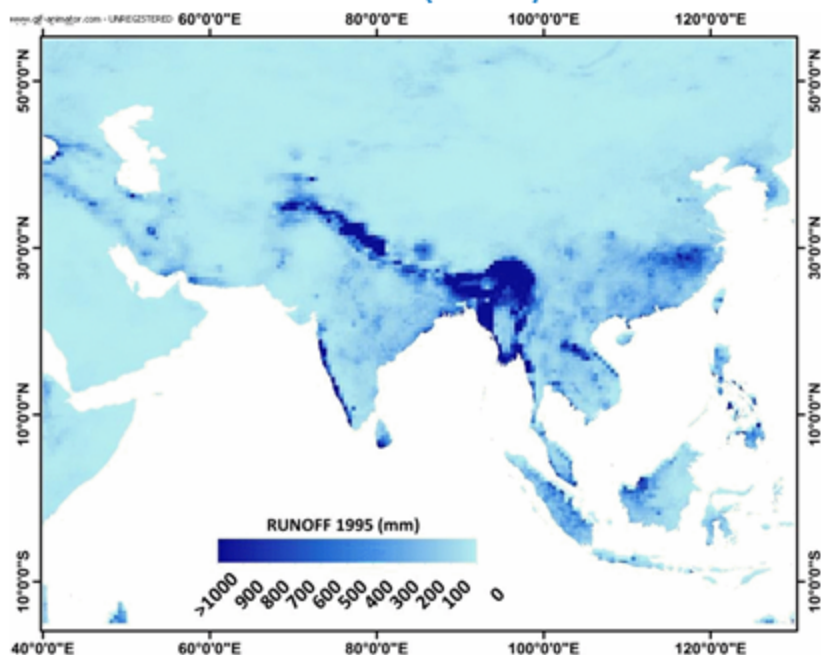
**Active GRIDs : 53945**

## Results of Calibration & Validation



Around 0.62 to 0.96 value of  $R^2$  has been achieved between observed discharge of major river basins of India (Ganga, Narmada, Mahanadi, Godavari, Krishna) and model predicted runoff.

## Results (2005)



## List of Land Surface Parameters Generated

- |  |   |
|--|---|
| ❖ Runoff   | ❖ Rainfall- Snowfall amounts                      |
| ❖ Evapotranspiration                               | ❖ Canopy Interception Storage                     |
| ❖ Bare Soil Evaporation                            | ❖ Average surface albedo                          |
| ❖ Transpiration from Vegetative surface            | ❖ Snow pack albedo                                |
| ❖ Soil Moisture of top soil layer (0-30 cm)        | ❖ Net heat flux into ground                       |
| ❖ Soil Moisture of middle soil layer (30 - 100 cm) | ❖ Net upward latent heat flux                     |
| ❖ Soil Moisture of bottom soil layer               | ❖ Incoming longwave at ground surface (under veg) |
| ❖ Fractional area of Snow Cover                    | ❖ Energy of fusion (melting) in snowpack          |
| ❖ Snow depth (mm)                                  | ❖ Net downward longwave flux                      |
| ❖ Snow Water Equivalent (SWE)                      | ❖ Net downward shortwave flux                     |
| ❖ Change in SWE                                    | ❖ Net downward radiation flux                     |
| ❖ Bare Soil Temperature                            | ❖ Net upward sensible heat flux                   |
| ❖ Average radiative surface temperature            | ❖ Energy budget error                             |
| ❖ Emitted long wave radiation from earth surface   | ❖ Water budget error                              |

**These LSPs are needed in various Hydrological, Climatic (NWP), Ecological, Agricultural System Models**