The Caribbean Drought and Precipitation Monitoring Network:

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Why Plan for Drought

- Normal part of climate; recurrent phenomenon
- Occurs in virtually all regions—a global issue
- Affects more people than any other natural hazard
- Impacts exceed those of other natural disasters
- Impacts often linger for years beyond the termination of the event
- Retards the development process
- Increasing competition for a limited resource

Attributes of the CDPMN

- Precipitation status monitored using a number of indices
- …Standardized Precipitation Index; Palmer Drought Severity Index; Crop Moisture Index
- Other indicators (e.g. water levels, state of vegetation and ecosystems)
- Final precipitation status determined, by consensus, by a network of persons from different sectors, institutions and communities embracing the diversity in definitions and impacts of drought
- Short term and seasonal precipitation forecasts to provide a projection of future drought (1 - 6 months possible)

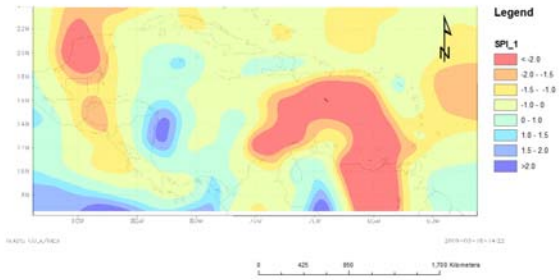
- CDPMN launched under CARIWIN in January 2009
- CDPMN expected to be fully operational by 2010

CDPMN on two scales

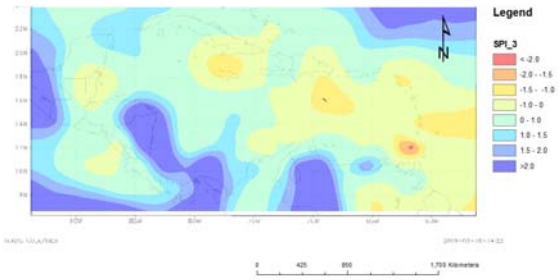
- Caribbean Basin Monitoring
- Country-level Monitoring

Caribbean SPI

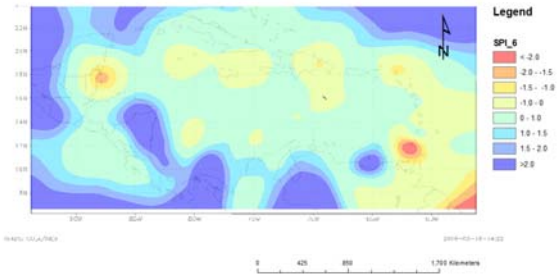
SPI for October 2009



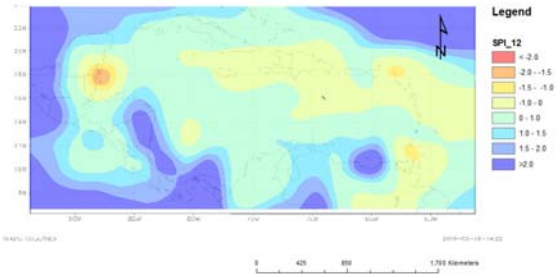
SPI for August to October 2009



SPI for May to October 2009

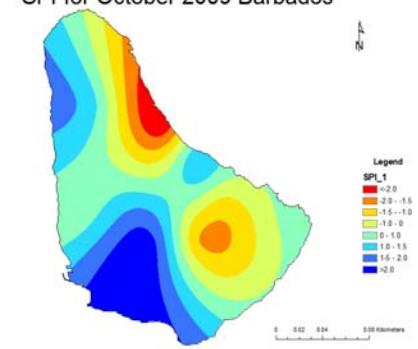


SPI for November 2008 to October 2009

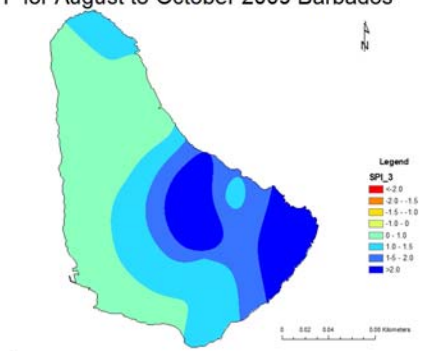


National SPI
Barbados

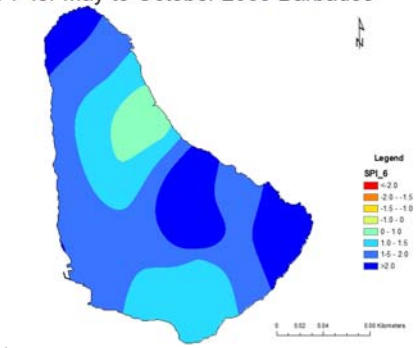
SPI for October 2009 Barbados



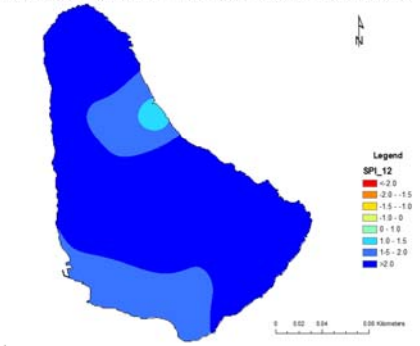
SPI for August to October 2009 Barbados



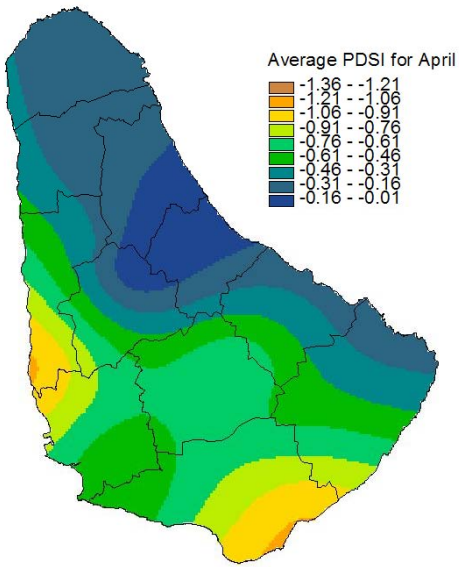
SPI for May to October 2009 Barbados

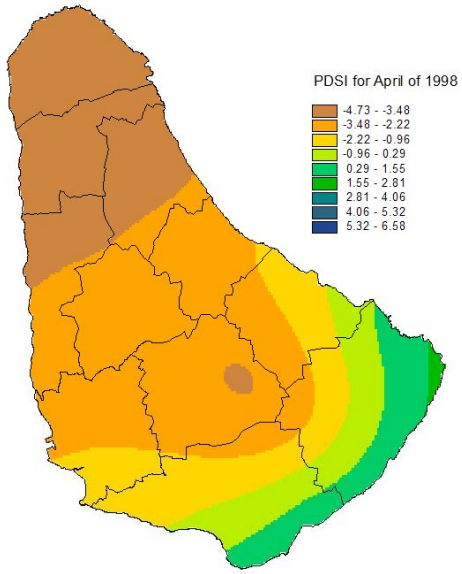


SPI November 2008 to October 2009 Barbados



National monitors allow for indices and indicators using information other than rainfall

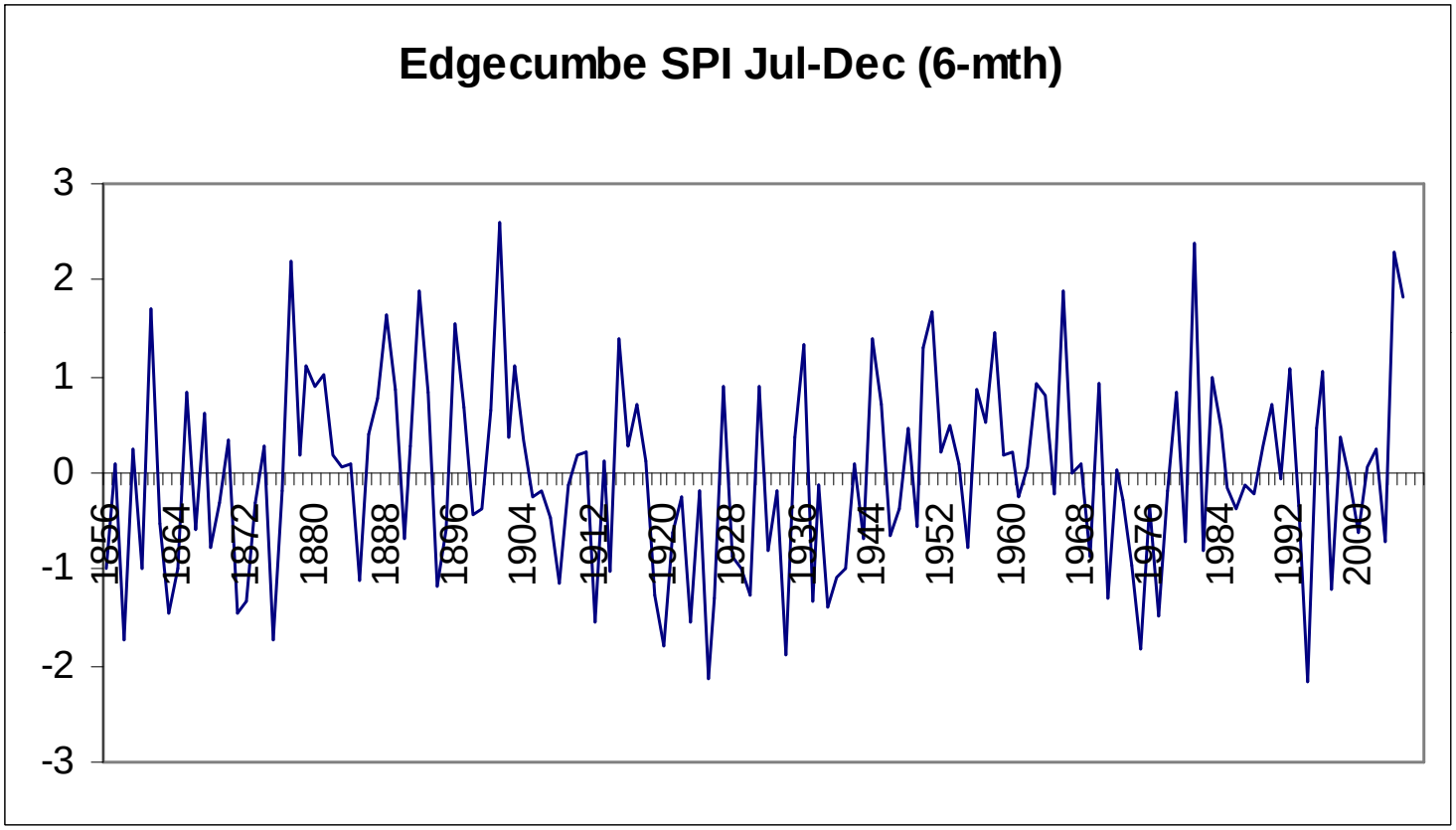




(a) Mean PDSI values for April and (b) PDSI for April 1998

Note the lower PDSI values in the El Niño year, 1998.

Wet Season SPI
Edgecumbe, Barbados

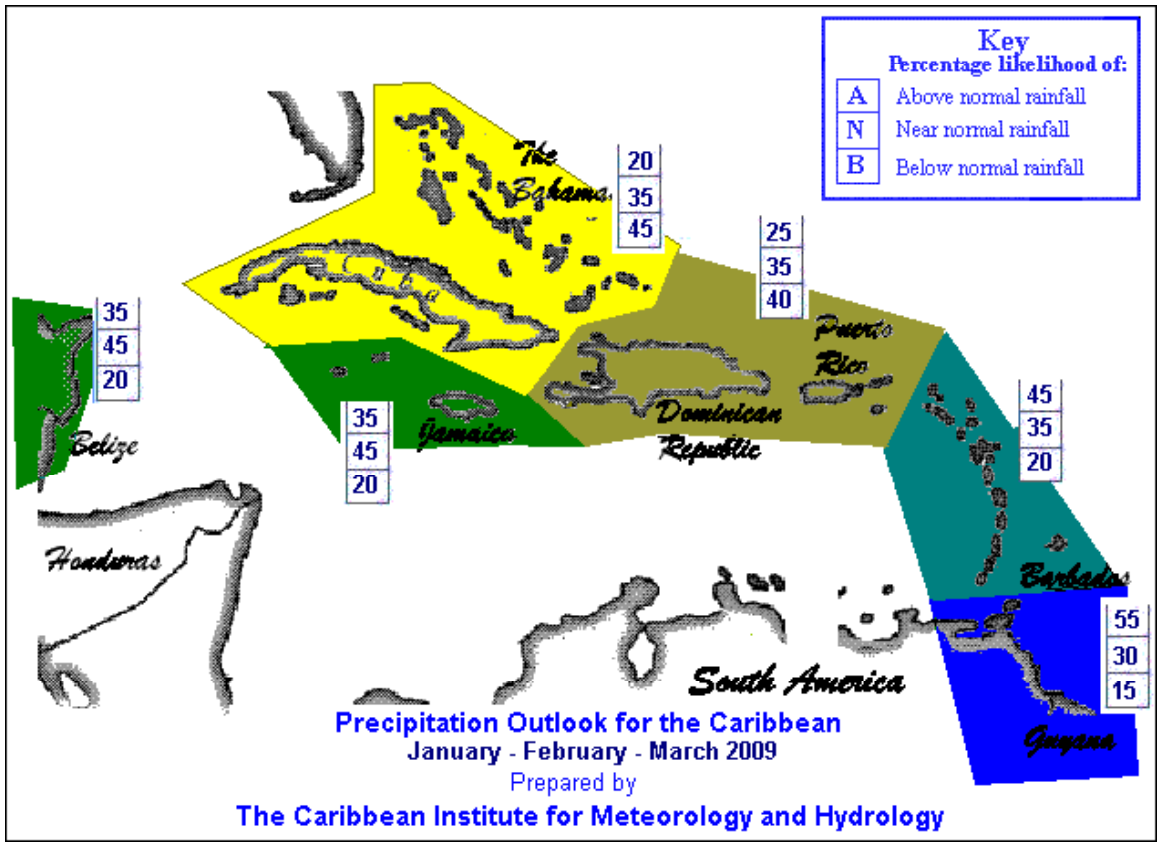


Indices can indicate history of timing, duration and severity of drought

Important for impact studies and adaptation considerations

As expected, the SPI showing similar cyclical trends as the rainfall

Prediction using Precipitation Outlook for the Caribbean?



Final PO output based on data from several models.

Drought prediction, use the final output or start from the models?

SPI Outlook

November

Station	1 mth	3 mth	6 mth	12 mth	
Wallblake	0.42 - 2.14	0.47 -2.51	-0.21-2.08	-0.94 -0.74	35
Anguilla	-0.42-0.42	-0.93 -0.47	-1.36- -0.21	-1.30- -0.94	40
	-1.65 - -0.42	-2.09 - -0.93	-2.14 - -1.36	-1.43 - -1.30	25
VC Bird	0.43 - 2.31	0.51 - 3.39	0.6 - 2.67	0.82 - 2.43	35
Antigua	-0.42 - 0.43	-0.85 -0.51	-0.17 - 0.6	0.32 - 0.82	40
	-1.66 - -0.42	-2.84 - - 0.85	-1.08 - -0.17	-0.24 - 0.32	25
Bayaguana	0.42 - 1.9	0.54 – 3.23	0.19 - 2.59	0.22 – 2.3	30
DR	-0.42 - 0.42	-0.74 - 0.54	-0.71 – 0.19	-0.45 – 0.22	45
	-2.19 - - 0.42	-2.62 - -0.74	-1.93 - - 0.71	-1.18 - - 0.45	25
Piarco	0.43 – 2.02	0.63 – 3.31	-0.77 – 1.47	-0.28 -1.46	20
Trinidad	-0.44 – 0.43	-0.86 – 0.63	-1.8 - -0.77	-1.04 - -0.28	35
	-2.82 - -0.44	-3.93 - -0.86	-3.74 - -1.8	-2.43 - -1.04	45

CHALLENGES

- Climatological and Real Time Data a concern
- Efforts are on stream for DATA RESCUE
- For In-country monitoring lack of soil, stream flow and reservoir data

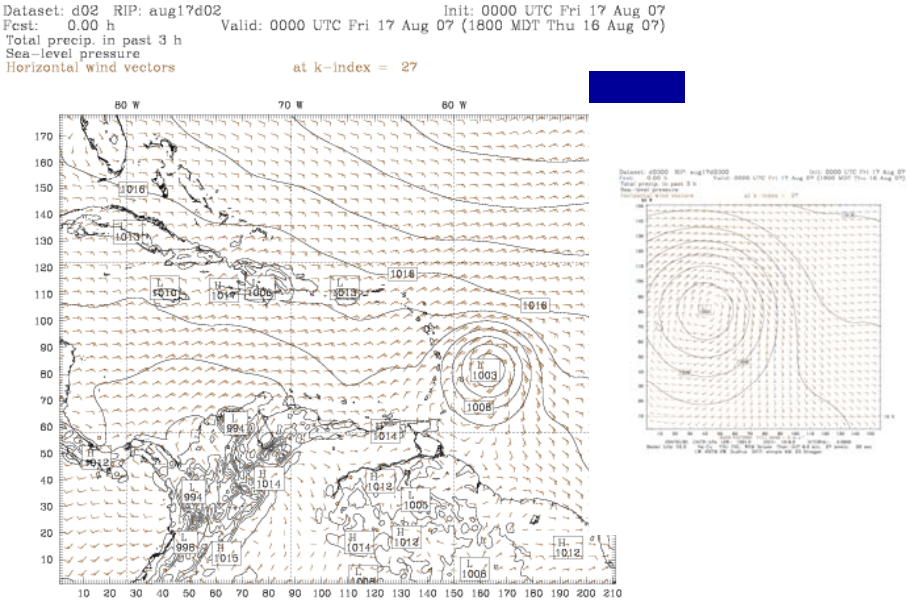
- In the case of the Caribbean basin, need data across, not provincial, but country boundaries (mainly islands)
- Language – English, Spanish, French, Dutch

- Non land-based data (e.g. reanalysis) not always representative

Improved Flood Forecasting for the Caribbean

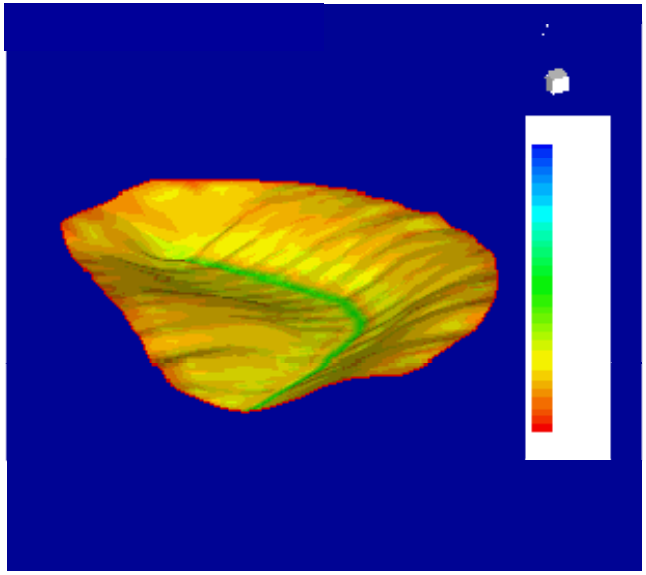
- Integrate precipitation forecasts into a hydrological model
  - Provides an early flood warning system before the precipitation event
  - Leads times of at least two days
  - Forecast updates (weather radar)
  - Water depths simulated throughout catchment
  - Flood extents delineated

The models



Weather Research Forecasting model

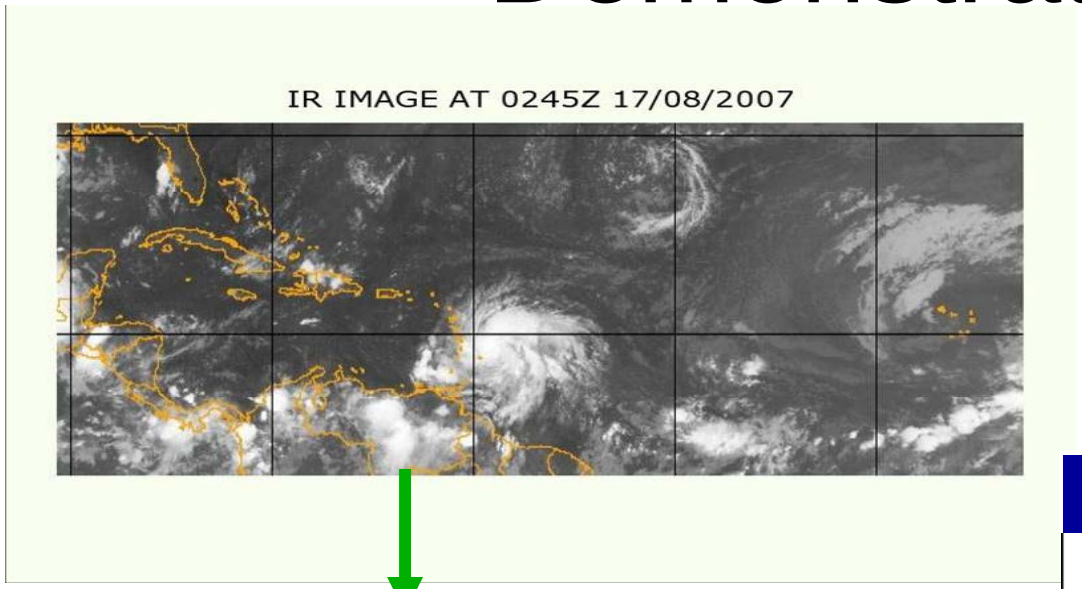
- Outputs: atmospheric variables at all levels of the troposphere; the state of the atmosphere at different times in the future
- Forecasting tool:
  - Provides simulations on different spatial scales
  - Real-time forecasting out a fortnight
  - Can be altered to better represent the tropical atmosphere
  - Regional climate scenarios

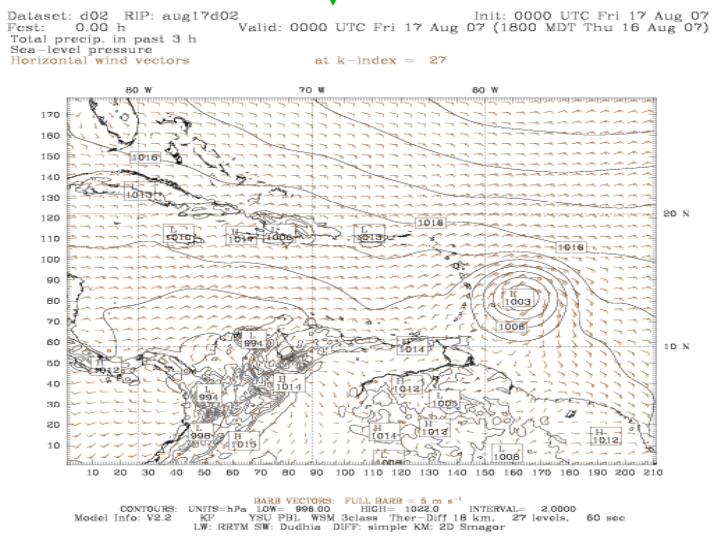


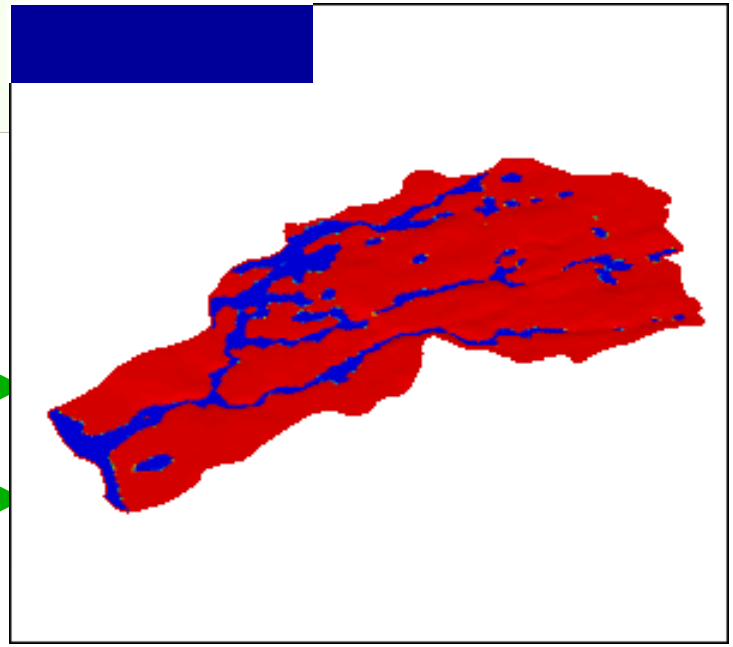
HydroGeoSphere (Hydrological Model)

- Outputs: Water depths; SW/GW flows; GW saturations; Concentrations
- Water resources management tool
  - Flood forecasting
  - Simulate impact of contaminant transport
  - Simulate climate change scenarios scenarios
  - Real time monitoring

Demonstration







Outcomes of the CDPMN

1. Through the hydrometric stations and sensor data, monitor hydrological indicators, climate indicators...
2. Projection of future status (using precipitation forecasts and drought indices
3. Early warning information through CIMH website and networking with key agencies, governments
4. Build adaptation and response strategies to drought and flooding events – collaboration with a network of communities, researchers and decision makers

Drought and Flood Planning

- Data collection, monitoring and dissemination
- Integrating climate indices and other indicators into routine decision making processes
- Determining existing needs, scientific knowledge gaps
- Forecasting, predicting, strengthening infrastructure
- Establish monitoring systems and early warning systems
- Information can then be used by decision makers at community level and national level to improve livelihoods
- …All toward MANAGING RISK

What About the Community?

- Measuring and recording
- Indicators (Indicate/identify impacts)
- Part of network team
- Mitigation and management plans/strategies
- Decision making based on early warning – plans into action

Drought planning is defined as actions taken by individual citizens, industry, government, and others before drought occurs to mitigate impacts and conflicts arising from drought.

Although drought is a natural phenomena, it is possible to reduce its negative affects.

Drought mitigation plans give chance to decision makers in order to prevent great damages with small cost