

# Working towards a delta-base

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&

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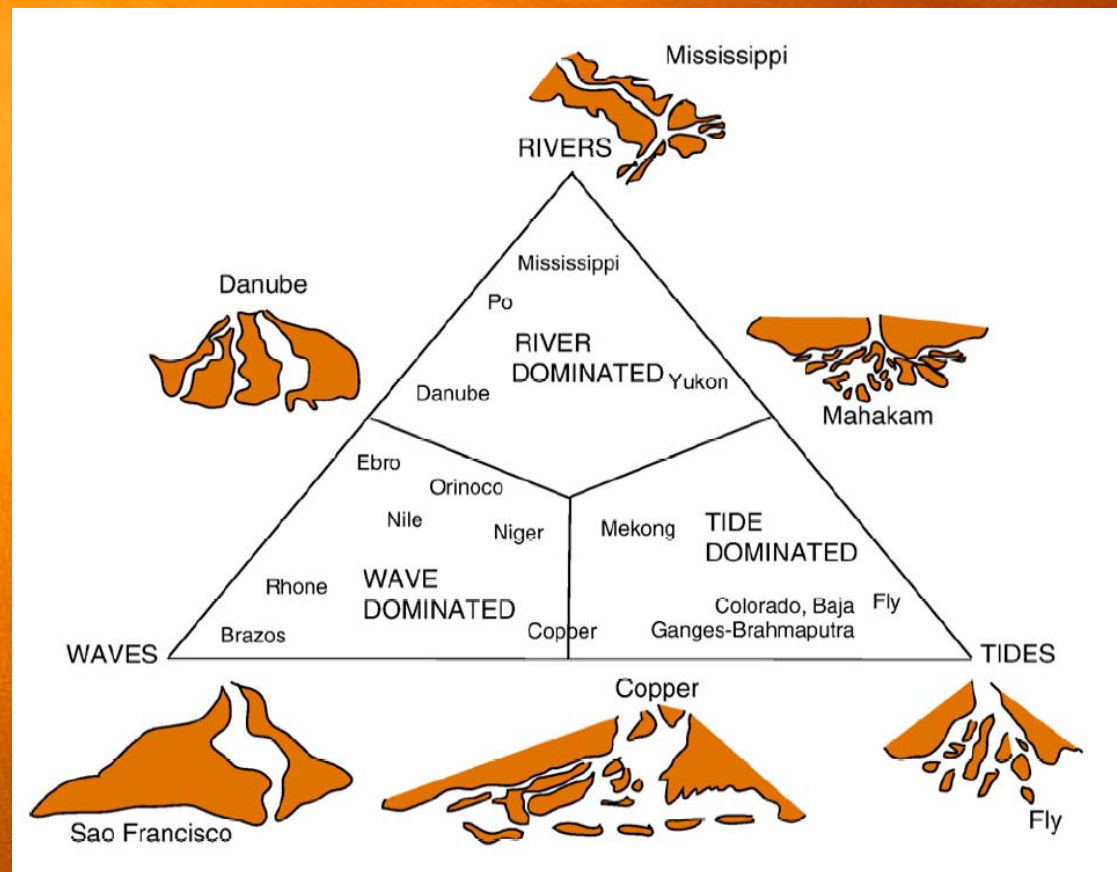


## Outline

- Why a delta database
- What data does the CSDMS group has:
  - Water and sediment flux of rivers
  - Wave and wind energy
  - Tidal energy
  - Elevation data
- What data do we need to meet our goal
  - Open for discussion.....
  - Vegetation / Population
  - .....

# Why a database?

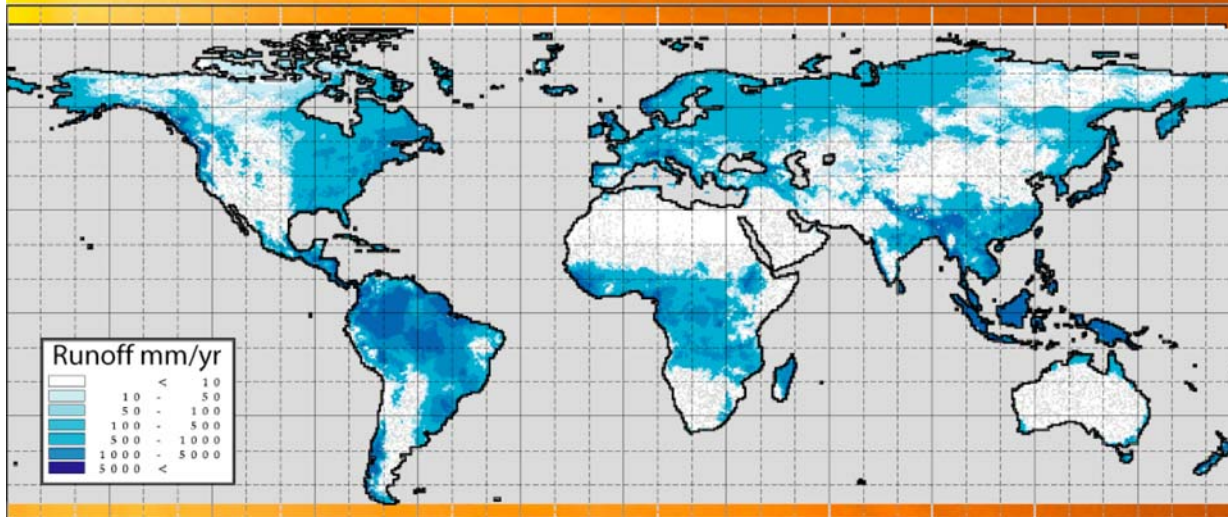
- Identify how vulnerable deltas are now and in the future  
Physical forces that might determine the vulnerability:



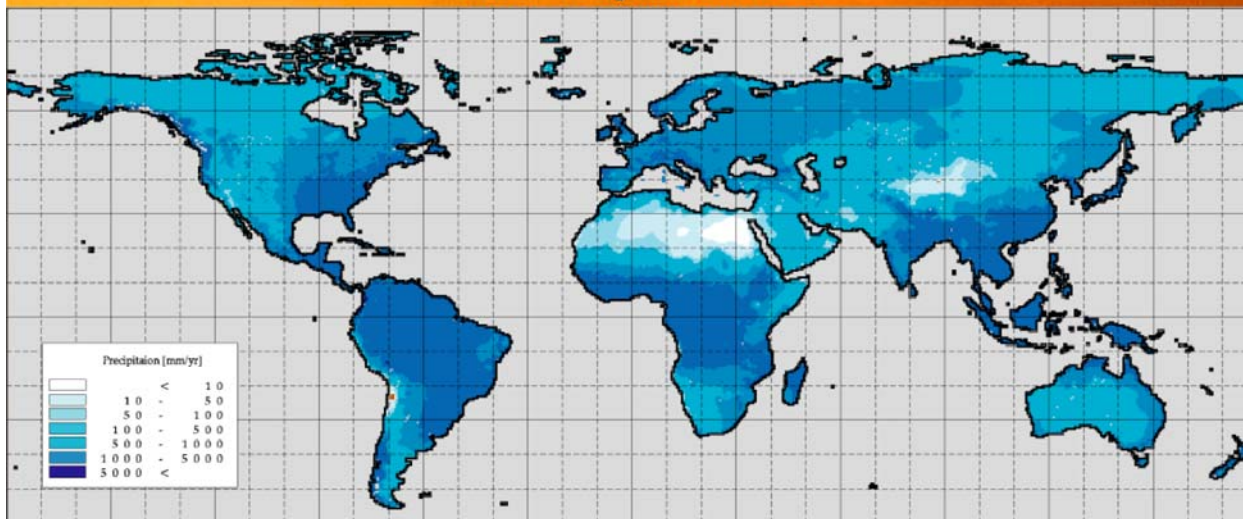
*Syvitski & Saito, 2007*

# Towards water discharge fluxes

## WBM-Simulated Mean Annual Runoff



## Willmott and Matsuura Mean Annual Precipitation 30-minute spatial resolution



WBM Model is based on:

$$R = P - E - (\partial W / \partial t)$$

$P$ , U. Delaware precipitation  
 $E$ , modified Penman-Monteith evapotranspiration using the Olson Terrestrial Ecosystem Model

$W$ , Thornthwaite soil moisture (FAO/UNESCO soil data bank)

U. Delaware precipitation is based on gridded  $0.5^\circ \times 0.5^\circ$  monthly rain-gauge data (NCDC Global Historical Climatology Network:  $\leq 16,360$  stations, 1950-1999)

# Global simulations of water discharge fluxes



# Global predictions of fluvial sediment fluxes

**BQART** Model predicts the sediment flux at the river mouth:

**B** term contains:

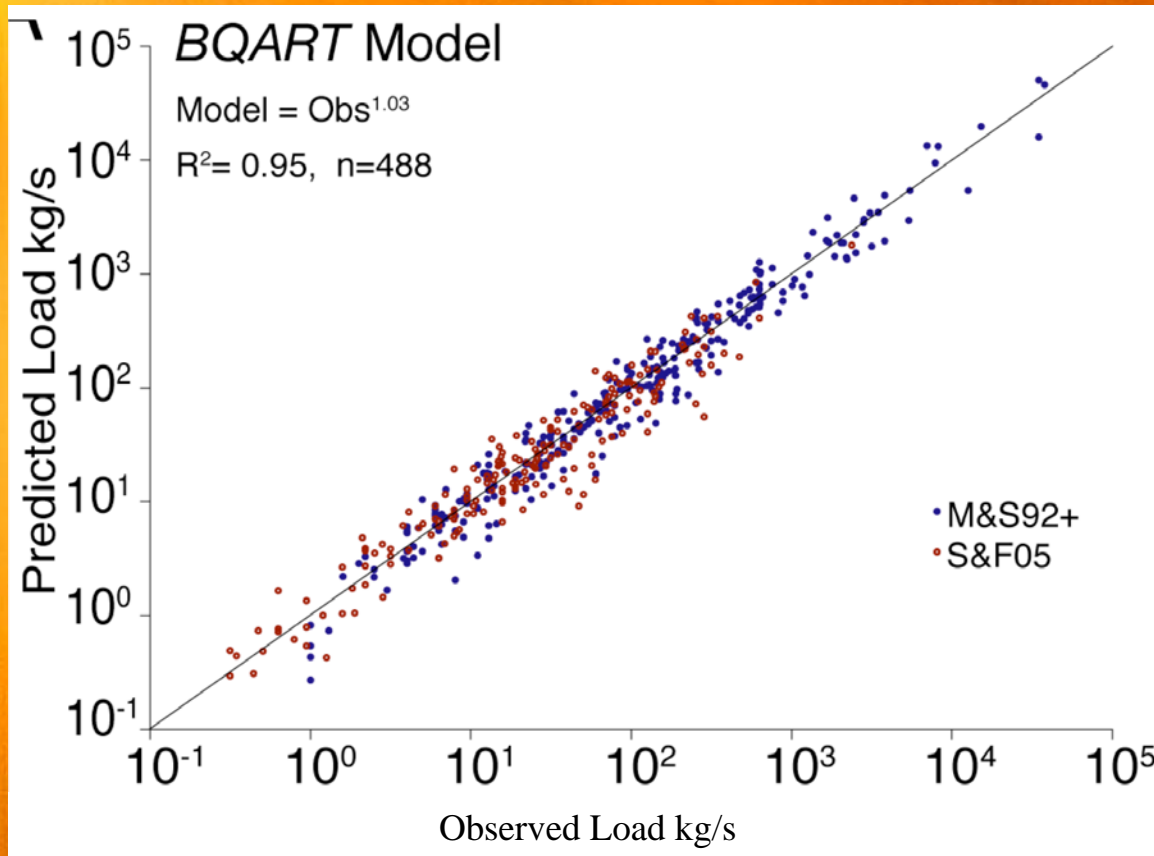
- i) glacial erosion;
- ii) trapping efficiency;
- iii) Lithology
- iv) human-influenced soil erosion

**Q** = water discharge

**A** = drainage basin area

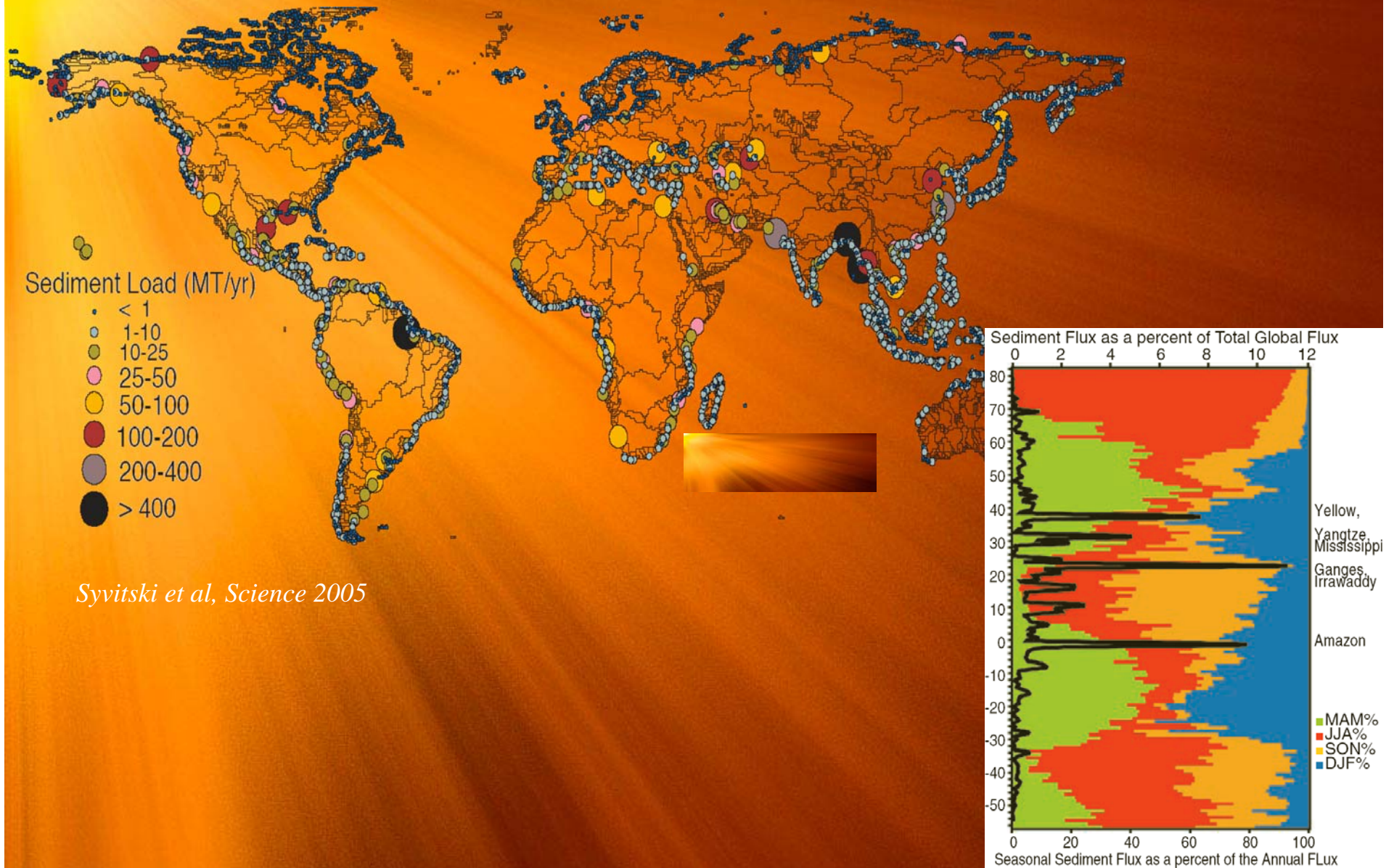
**R** = relief of the basin

**T** = mean temperature of the basin



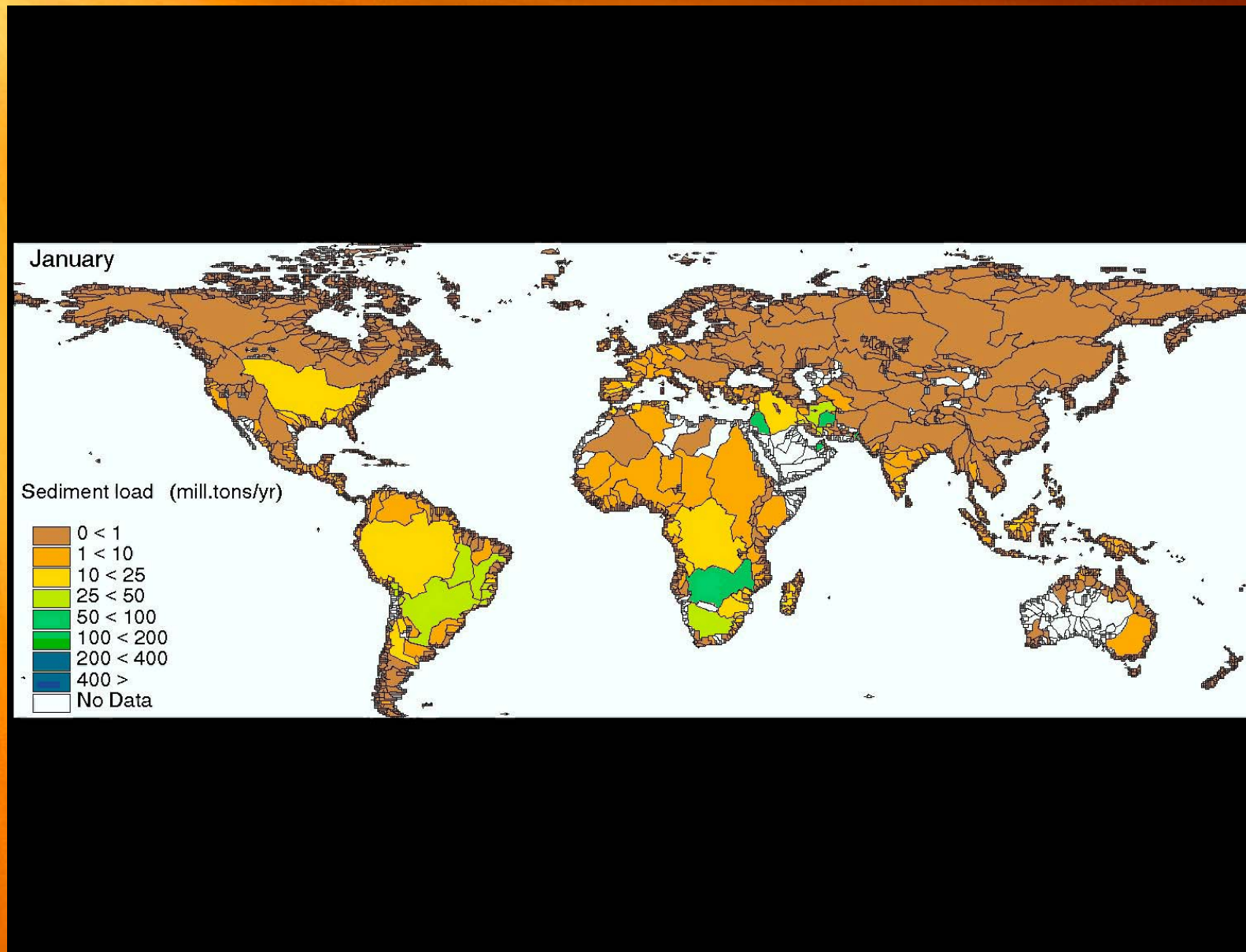
*Syvitski & Milliman, 2007*

# Global predictions of fluvial sediment fluxes II



*Syvitski et al, Science 2005*

# Global predictions of fluvial sediment fluxes III

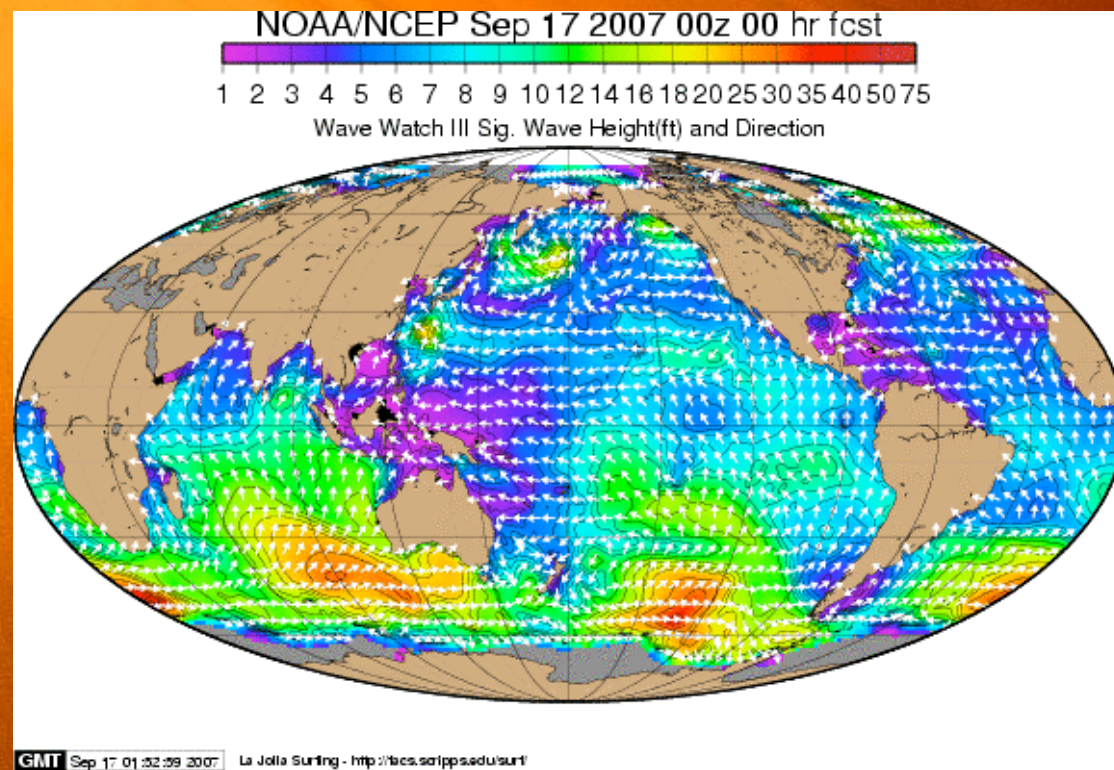




# Global wave & wind

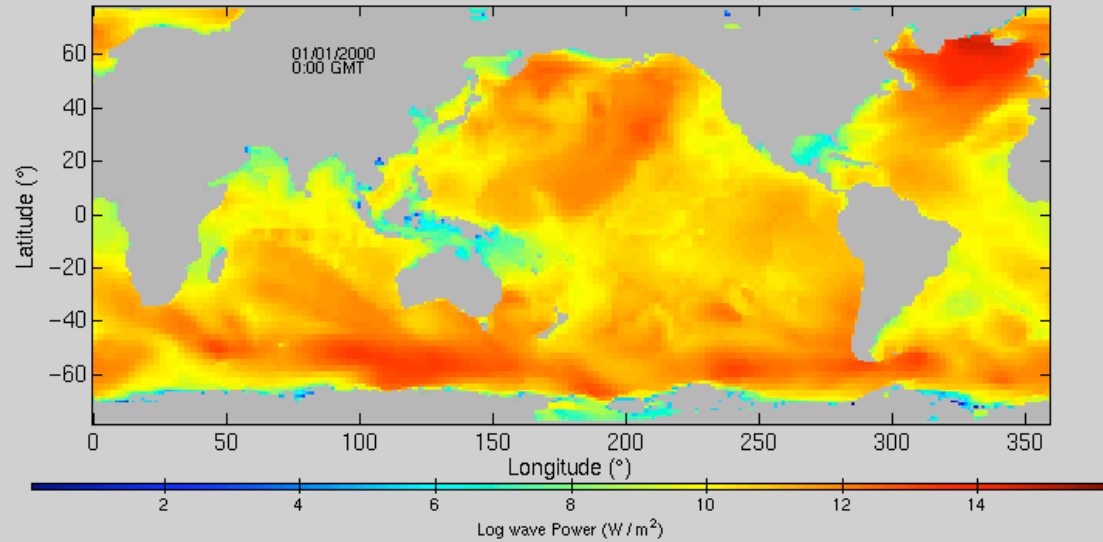
## Wavewatch III: Wave model of NOAA

- Data coverage: 1997 - present day
- Global 1x1.25 degree model with 3hour interval contains:
  - Wind speed and direction
  - Significant wave height and direction
  - Peak wave period and direction
- Visit: <http://polar.ncep.noaa.gov/waves/wavewatch/>

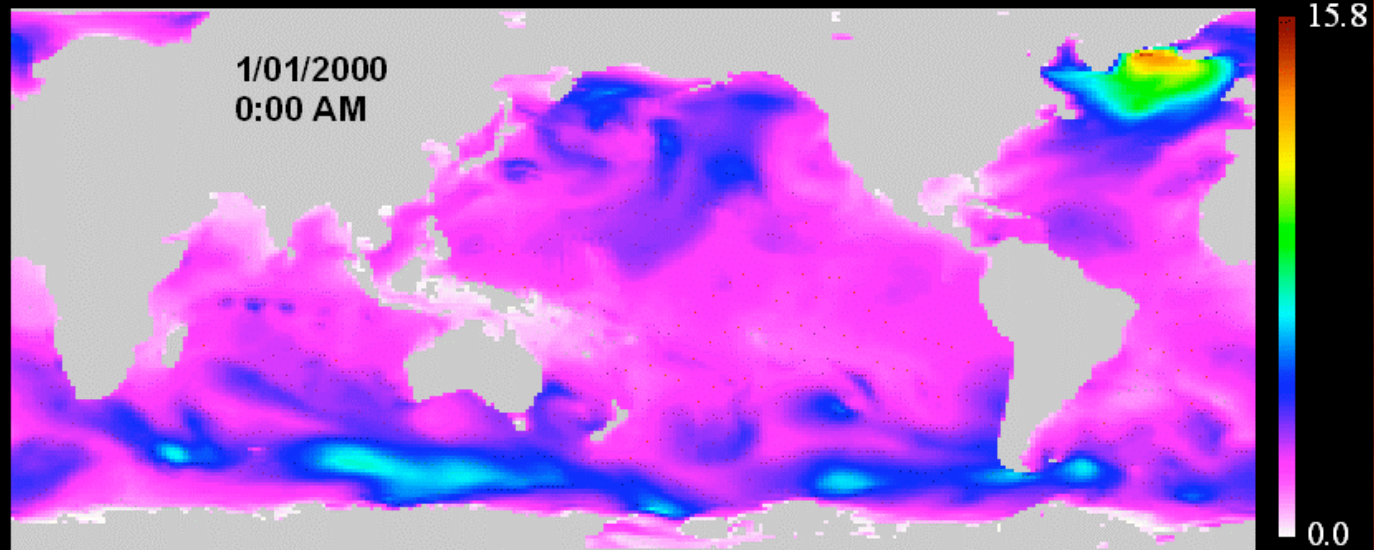


# Global wave database II

Wave Power  
Log ( $W/m^2$ )



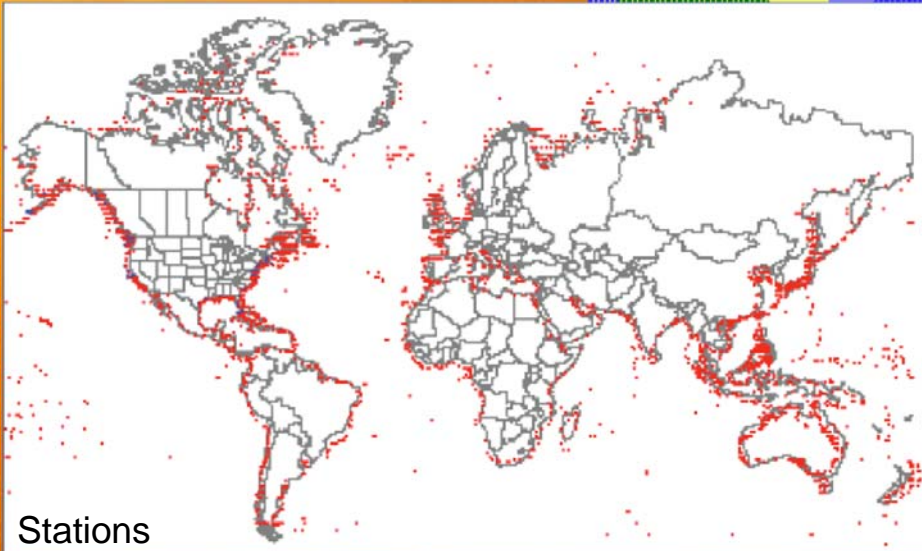
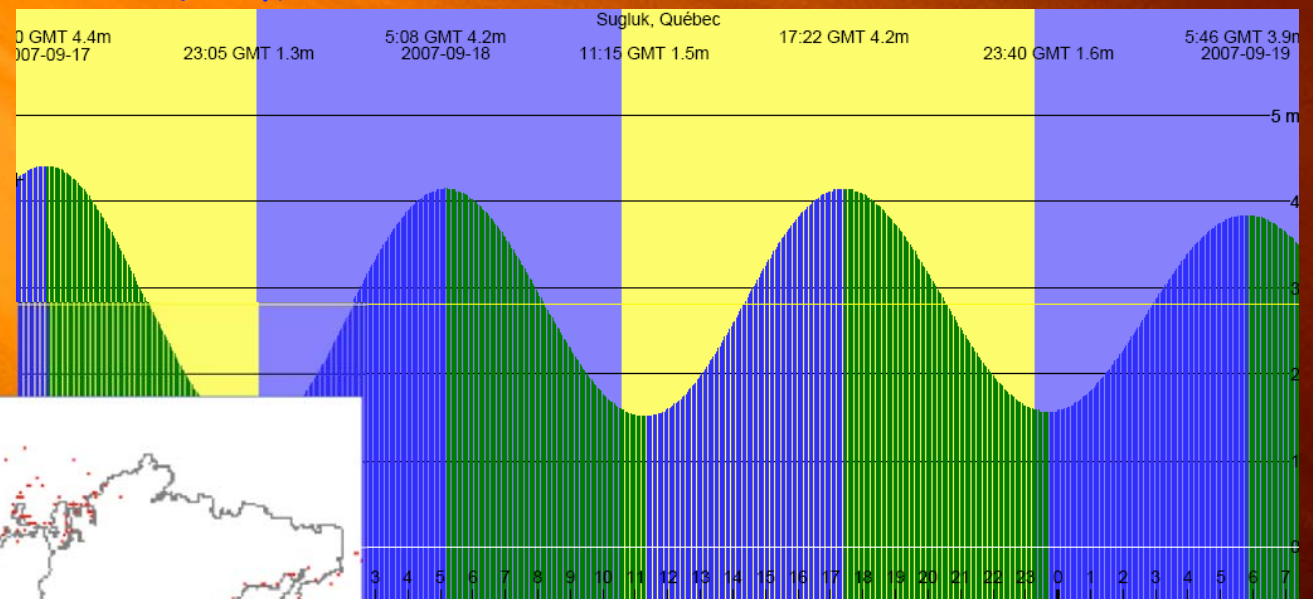
Wave Height  
(m)



# Global tides

WXTide32; free available tidal software by Mike Hopper:

- Contains over 9,500 tide stations
- Predicts tides from 1970 - 2038
- Visit: <http://wxtide32.com>

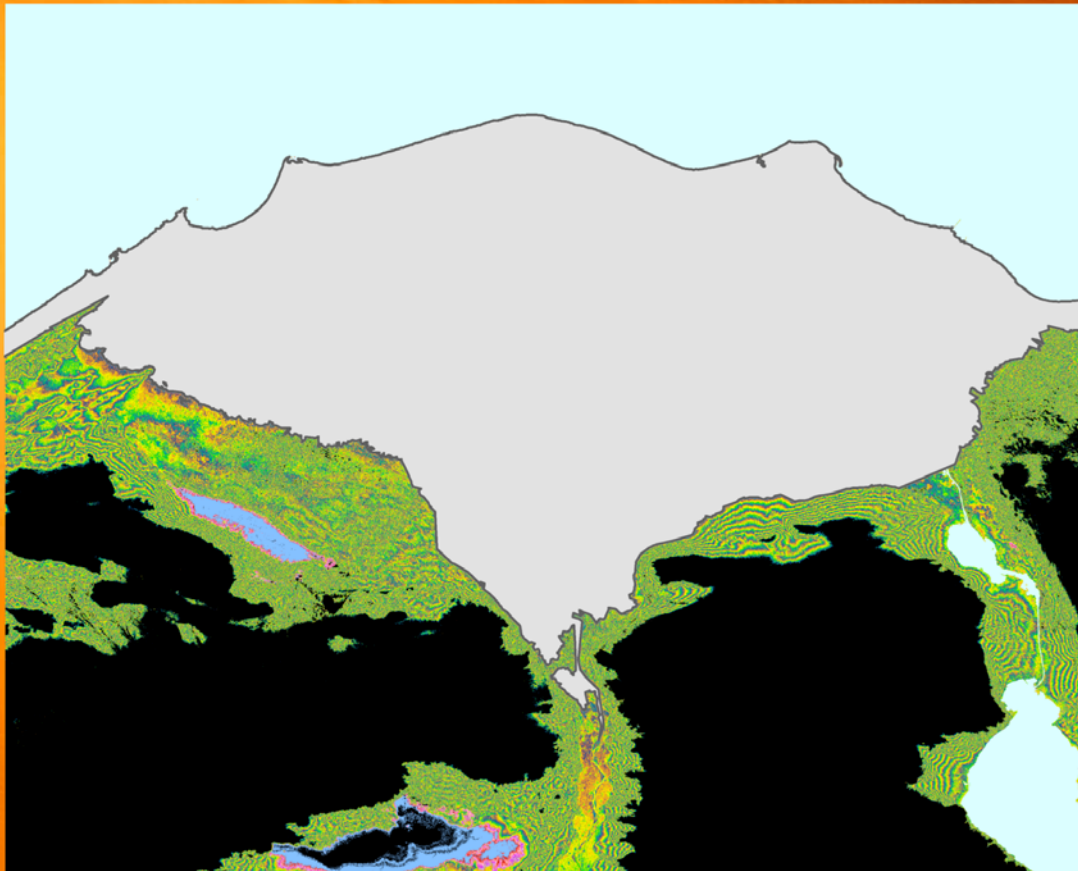


# Tides in Google earth



## SRTM elevation data

- Shuttle Radar Topography Mission elevation data:
  - Product: elevation data of 90 m<sup>2</sup> resolution of all the land between 60°S & 60°N lat.
  - Visit: <http://www2.jpl.nasa.gov/srtm/>



*SRTM data example of the Nile Delta*

## Summary of the data CSDMS has:

- River water discharge: Monthly water discharge global rivers (# > 4400 )
- River Sediment flux: Monthly sediment flux global rivers (# > 4400 )
- Waves: Wavewatch III; 1x1.25 degree model; 3hour interval
- Tides: 1970 - 2038 ( # > 9,500 )
- Elevation data: 90 m<sup>2</sup> resolution between 60°S and 60°N

## Open discussion for other datasets:

- 1).....