

Direction for Monsoon Research

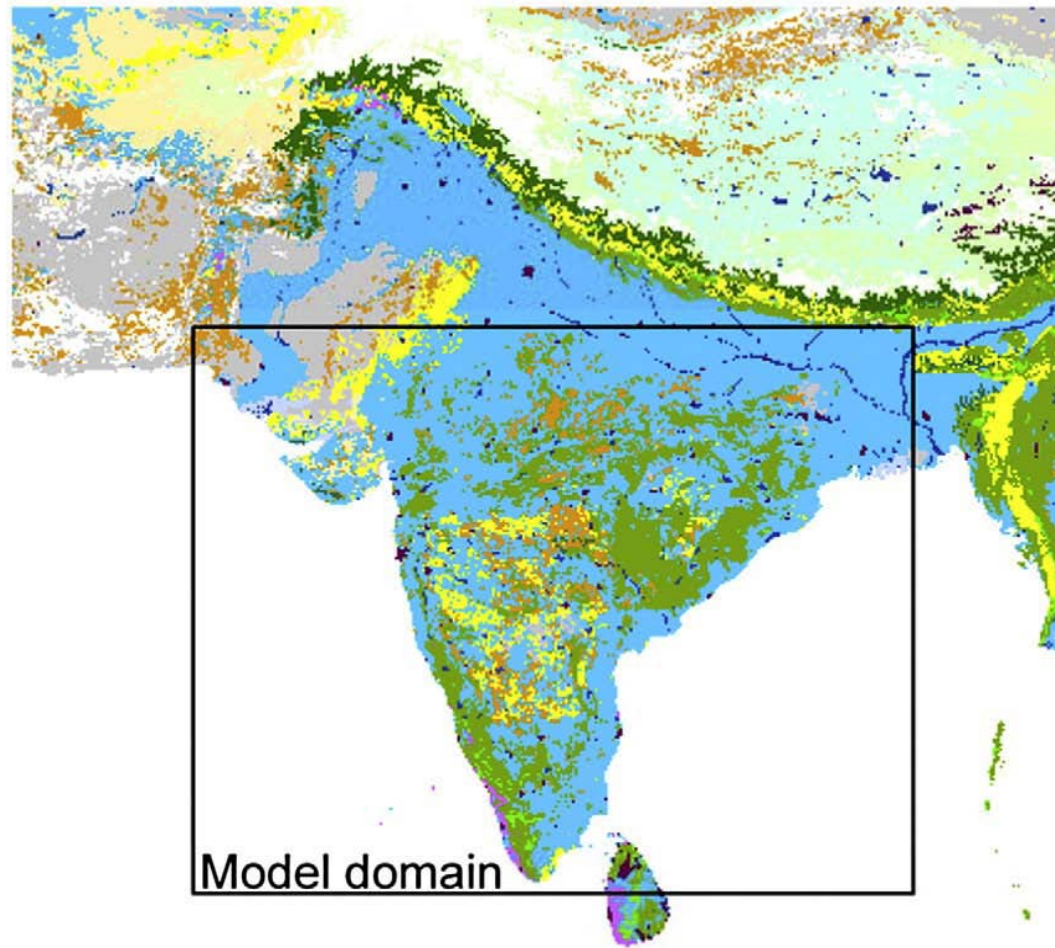
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1. Role of land (including crops/irrigation) in monsoon

- Crop/irrigation effect on Asian monsoon development
- Water table depth
- Water source for irrigation

Land cover in
India from the
GLC2000dataset.
Douglas et al.
(2009)

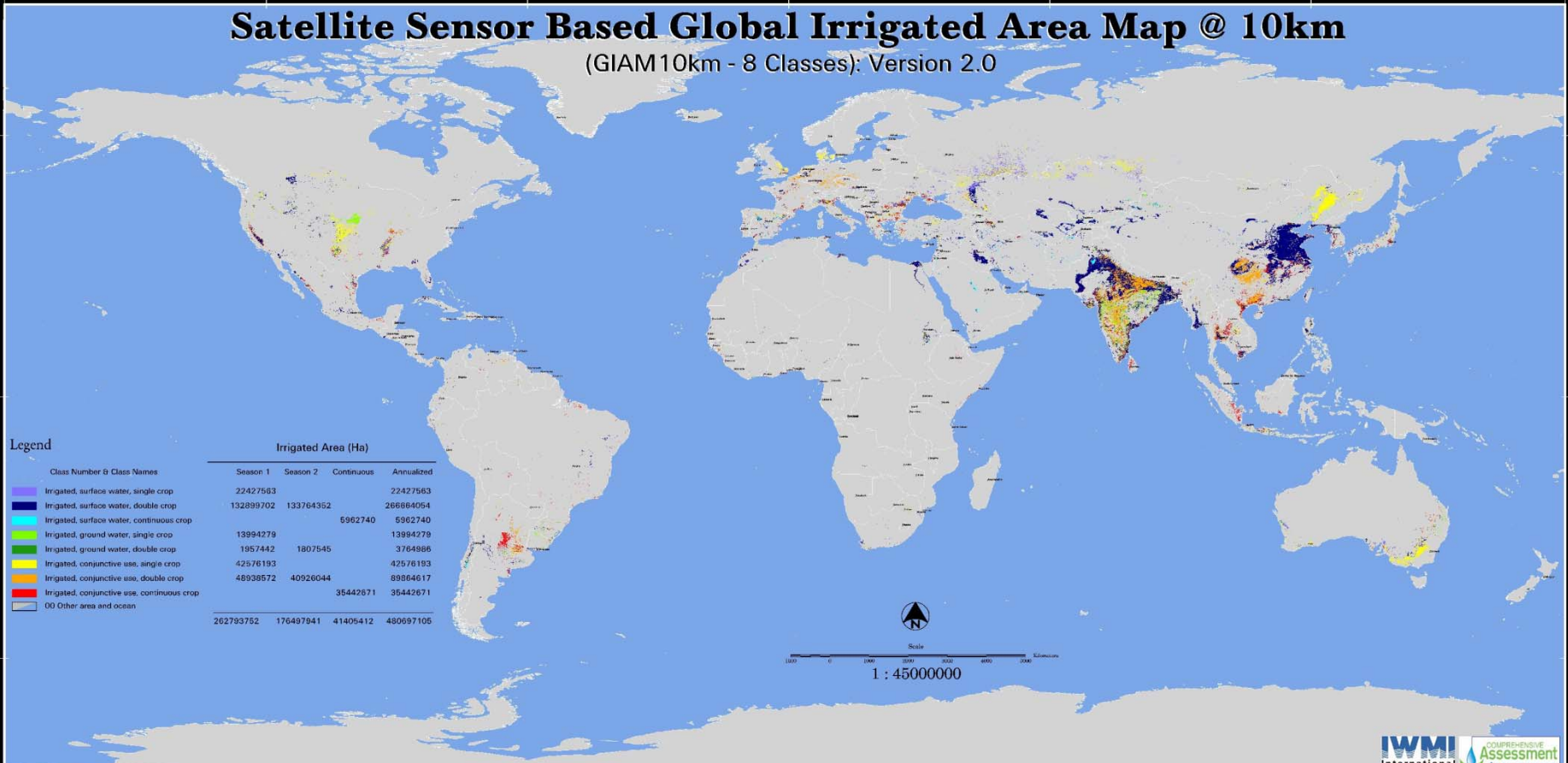


Landcover classes

 Lakes and rivers	 Desert	 Rainfed cropland
 Glaciers/ice	 Semi-desert	 Irrigated cropland
 Evergreen needleleaf	 Tundra	
 Deciduous broadleaf	 Evergreen shrub	
 Evergreen broadleaf	 Deciduous shrub	
 Short grass	 Mixed woodland	
 Tall grass	 Bog or marsh	

Satellite Sensor Based Global Irrigated Area Map @ 10km

(GIAM10km - 8 Classes): Version 2.0



Legend

- Class Number & Class Names
- 1 Irrigated, surface water, single crop
 - 2 Irrigated, surface water, double crop
 - 3 Irrigated, surface water, continuous crop
 - 4 Irrigated, ground water, single crop
 - 5 Irrigated, ground water, double crop
 - 6 Irrigated, conjunctive use, single crop
 - 7 Irrigated, conjunctive use, double crop
 - 8 Irrigated, conjunctive use, continuous crop
 - 00 Other area and ocean

Irrigated Area (Ha)			
Class Number & Class Names	Season 1	Season 2	Annualized
1	22427563		22427563
2	132899702	133764352	266664054
3		5962740	5962740
4	13994279		13994279
5	1957442	1807545	3764886
6	42576193		42576193
7	48938572	40926044	89864617
8		35442671	35442671
00	262793752	176497941	41405412
			480697105

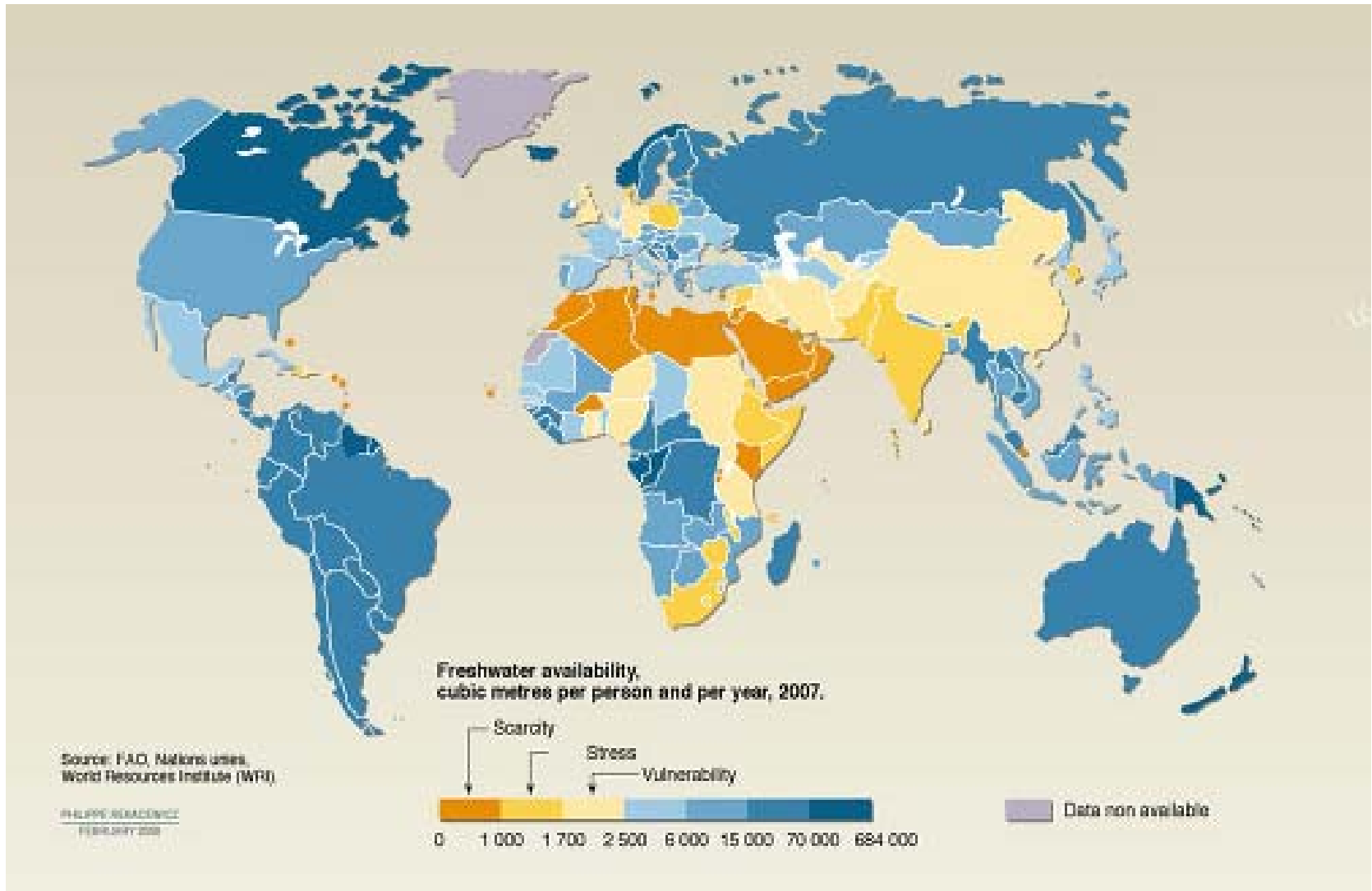


Scale



1 : 45000000

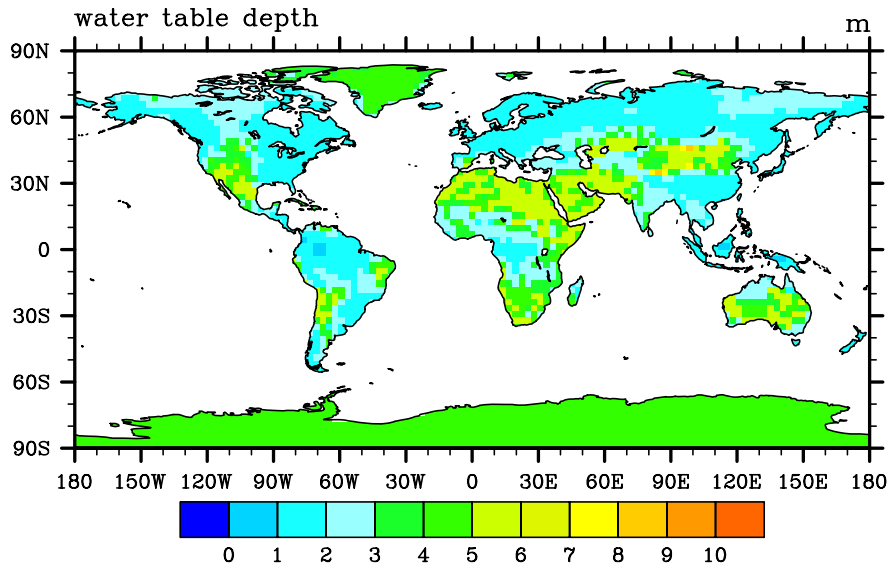
Fresh water availability



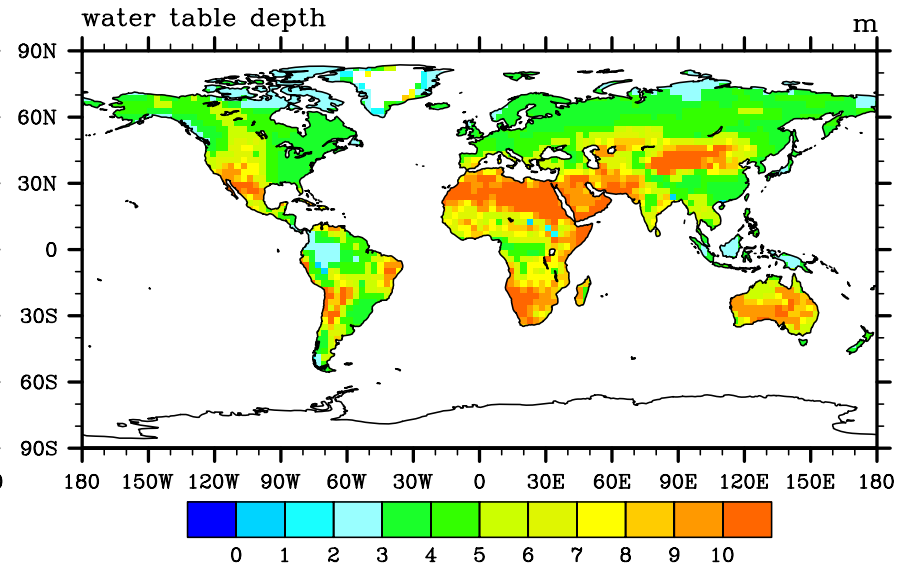
From UNEP

Mean Annual Water Table Depth

Control



New



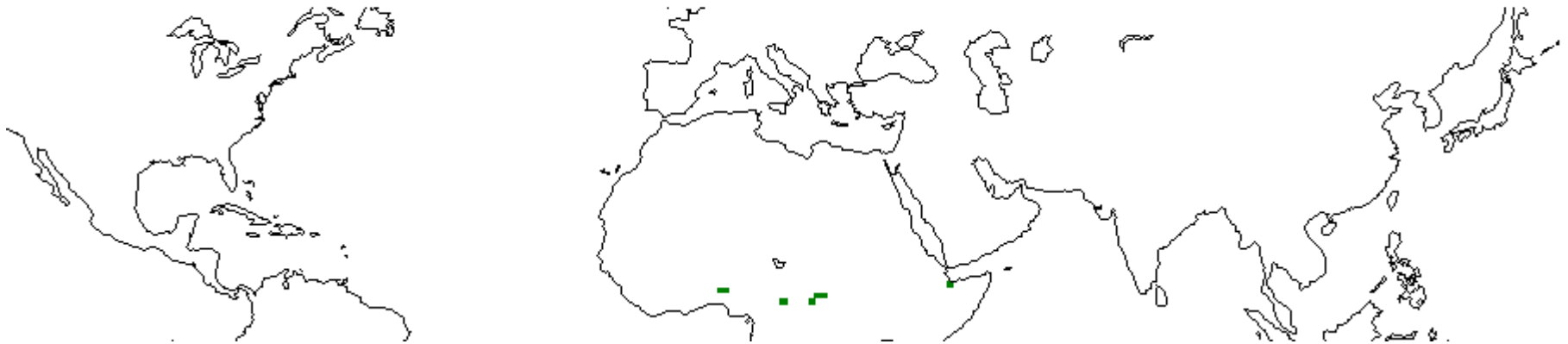
Decker and Zeng (2009)

2. Global monsoon

- There is spatial coherence in global monsoon onset and retreat
- Single value monsoon index for a whole monsoon region should be complemented by grid cell-based index
- For proposed monsoon diagnostics, include 2-m relative humidity and precipitable water (PW) for Category 1; and latent heat and sensible heat fluxes, and total soil moisture for Category 2.

Based on normalized PW
Zeng and Lu (2004)

Monsoon Onset Date 110



Based on normalized PW
Zeng and Lu (2004)

Monsoon Retreat Date 240

