

# Grundwasserhydrologie (Master Hydrologie)

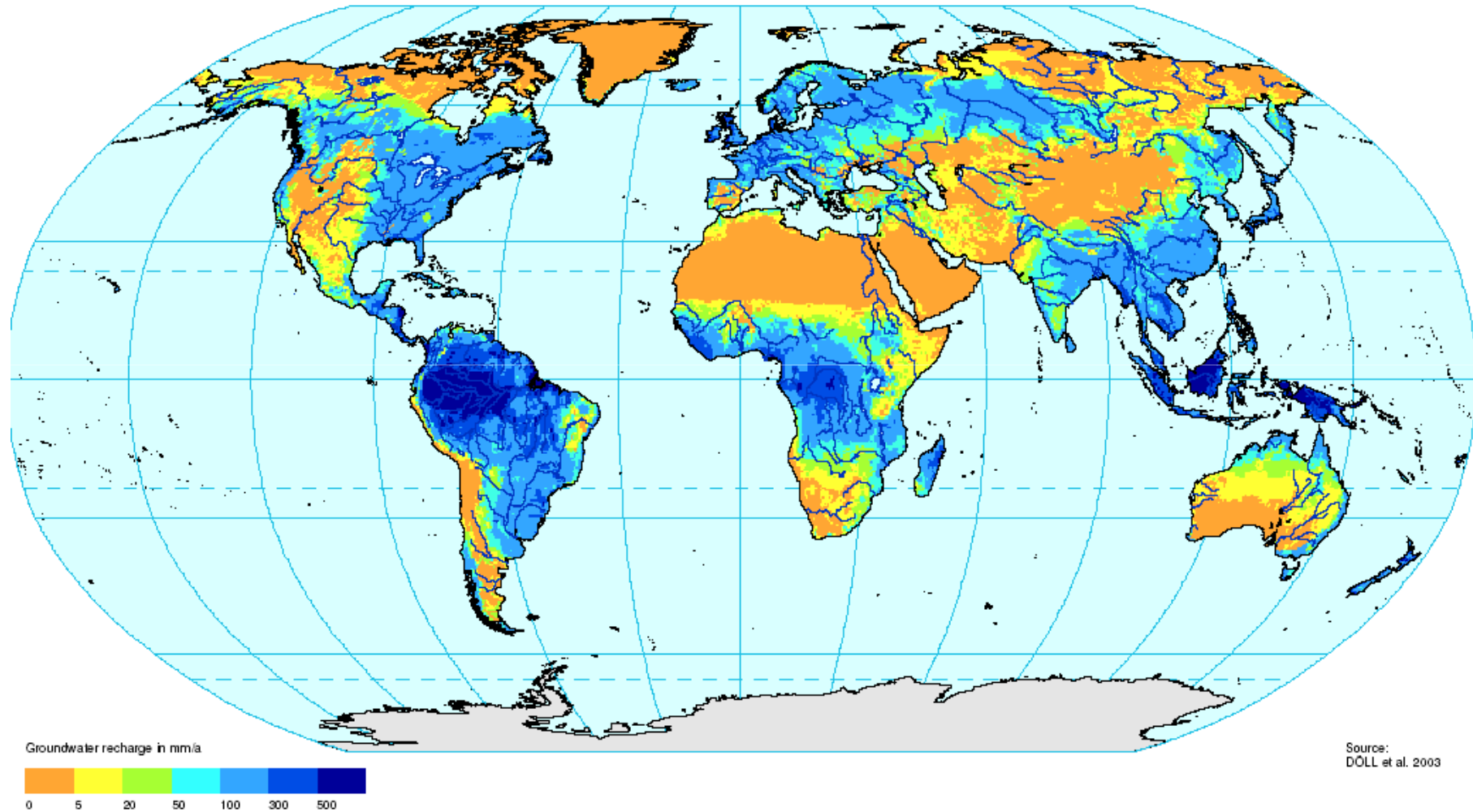
## Speicherung

Dr. Christoph Külls  
Wintersemester 2009/2010

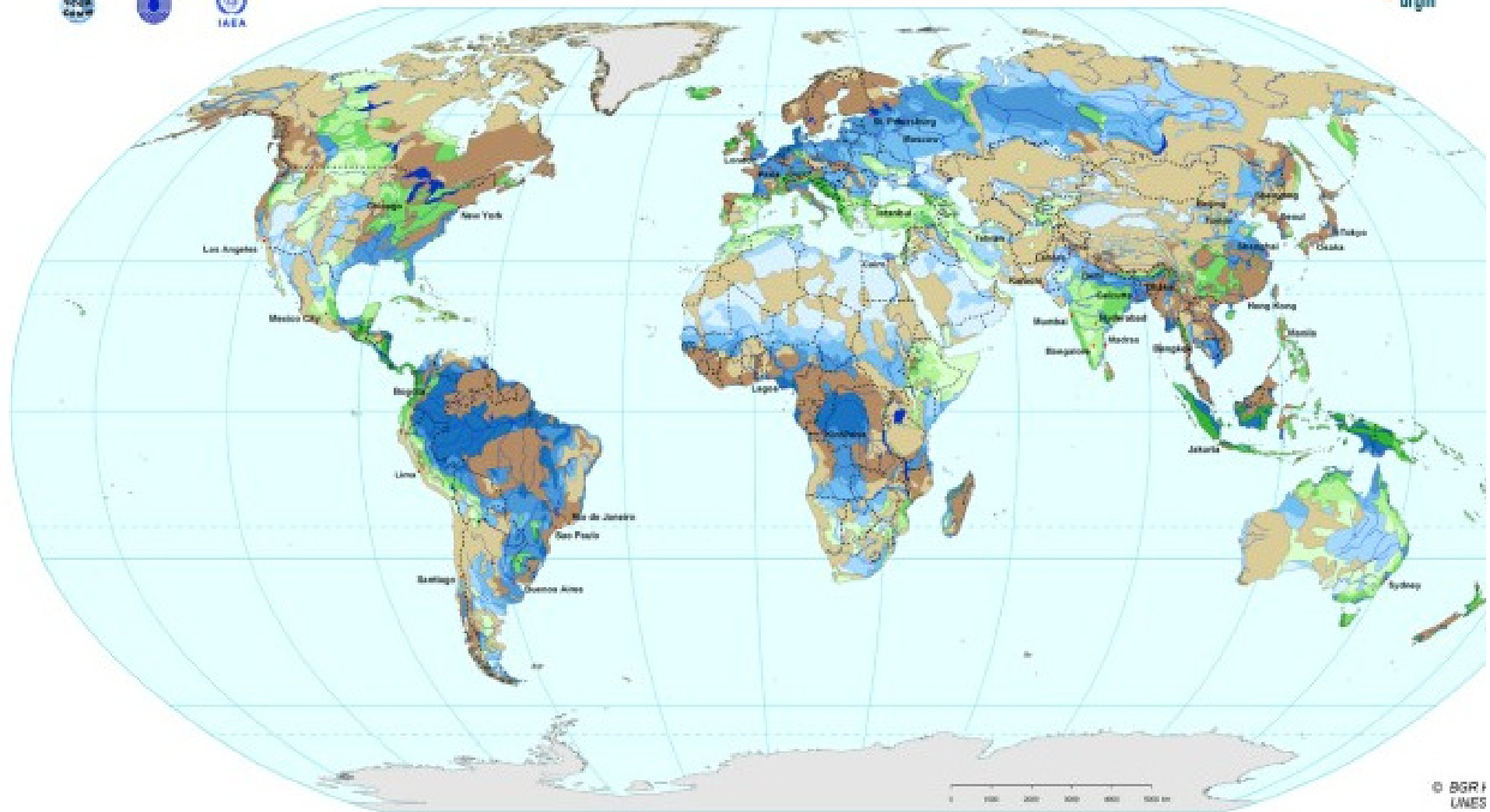
# GWN über Hydrologische Bilanzen

$$\mathbf{GWN = N - A - V \pm \Delta S}$$

Average annual groundwater recharge 1961 – 1990



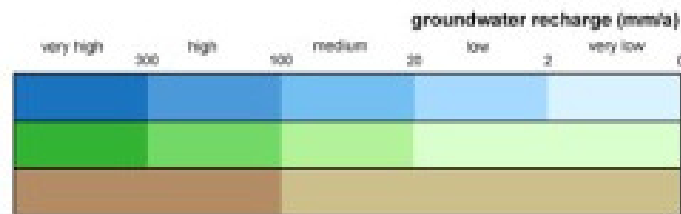
# Groundwater Resources of the World



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## Groundwater resources

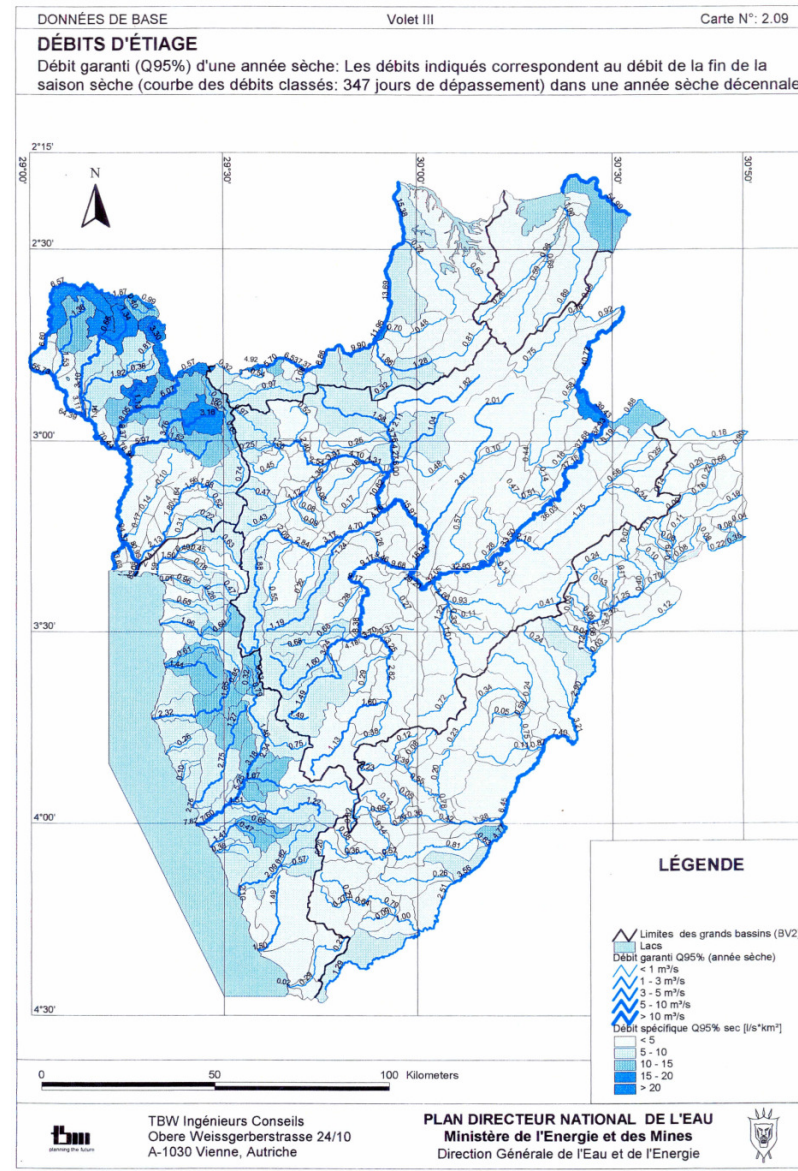
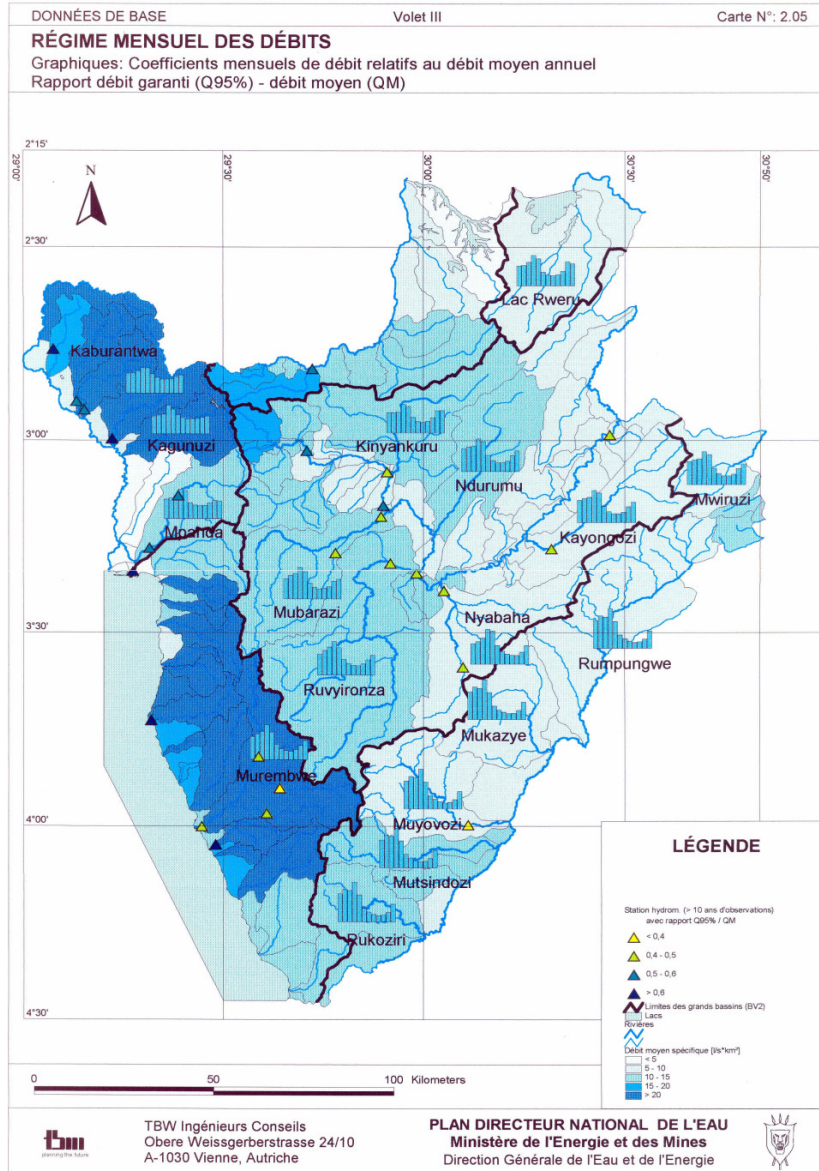
- in major groundwater basins
- in areas with complex hydrogeological structure
- in areas with local and shallow aquifers



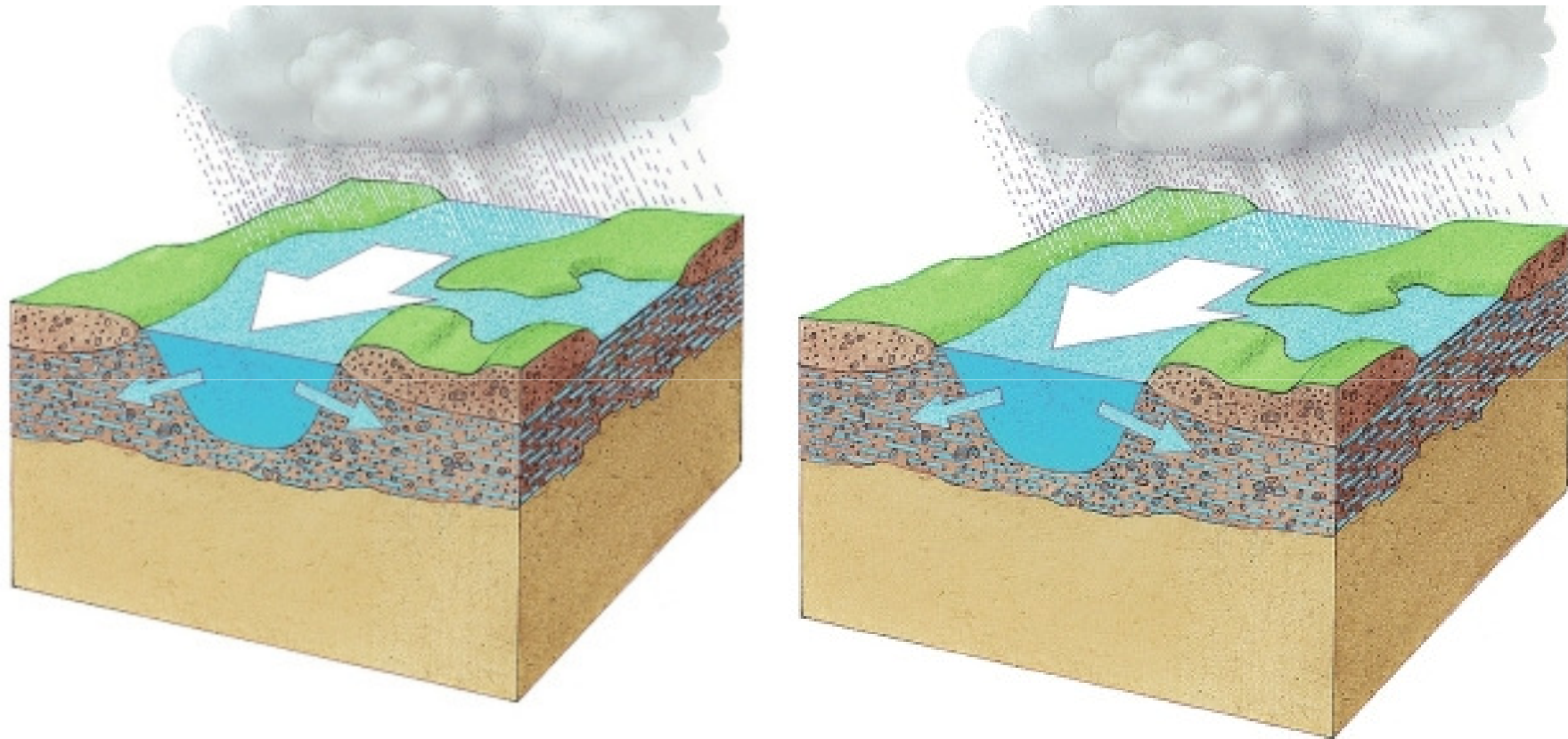
## Surface water & Geography

- major river
- large freshwater lake
- large saltwater lake
- continuous ice sheet
- selected city

# Bilanz und Speicherung

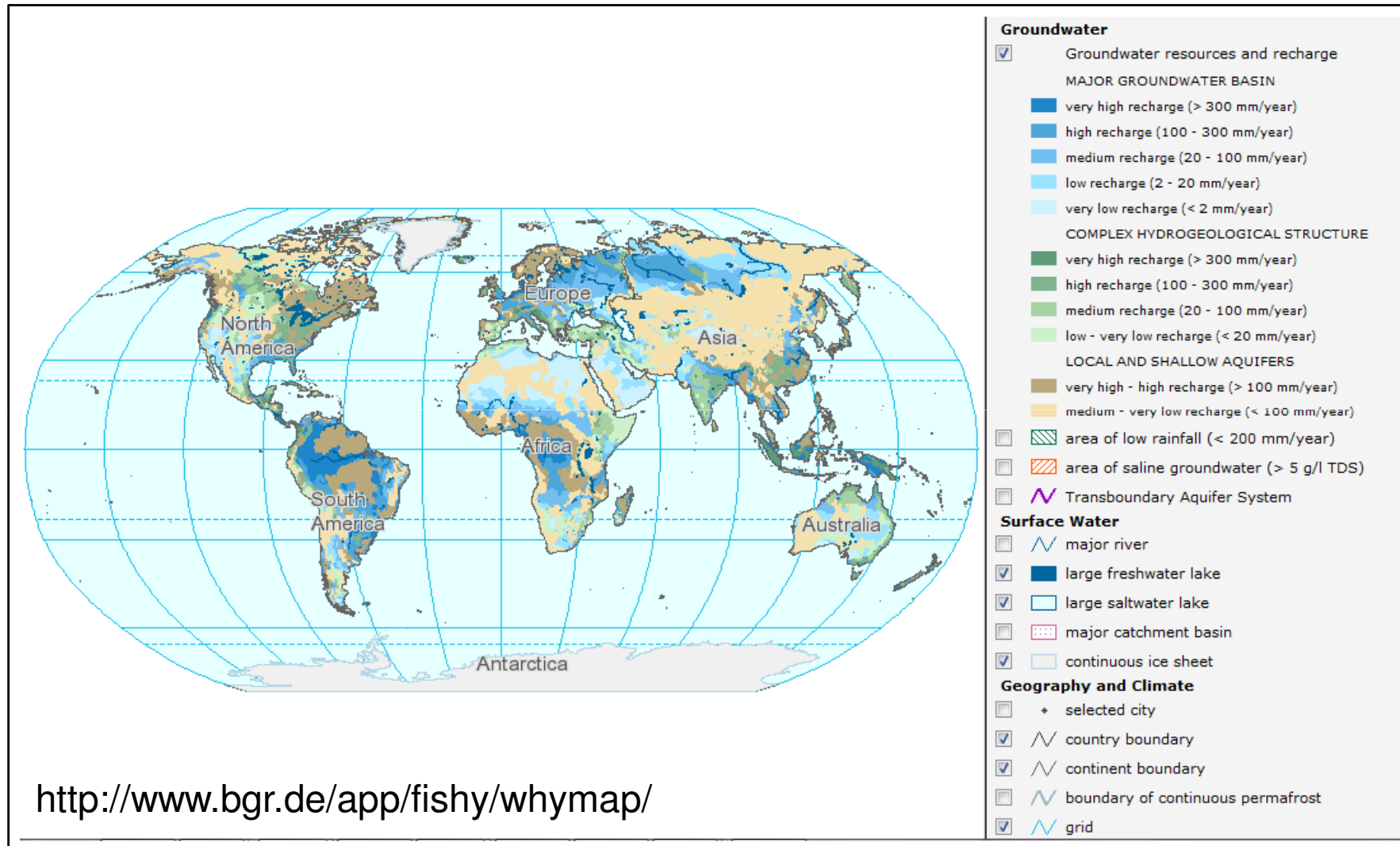


# Uferspeicherung mildert Abflussspitzen

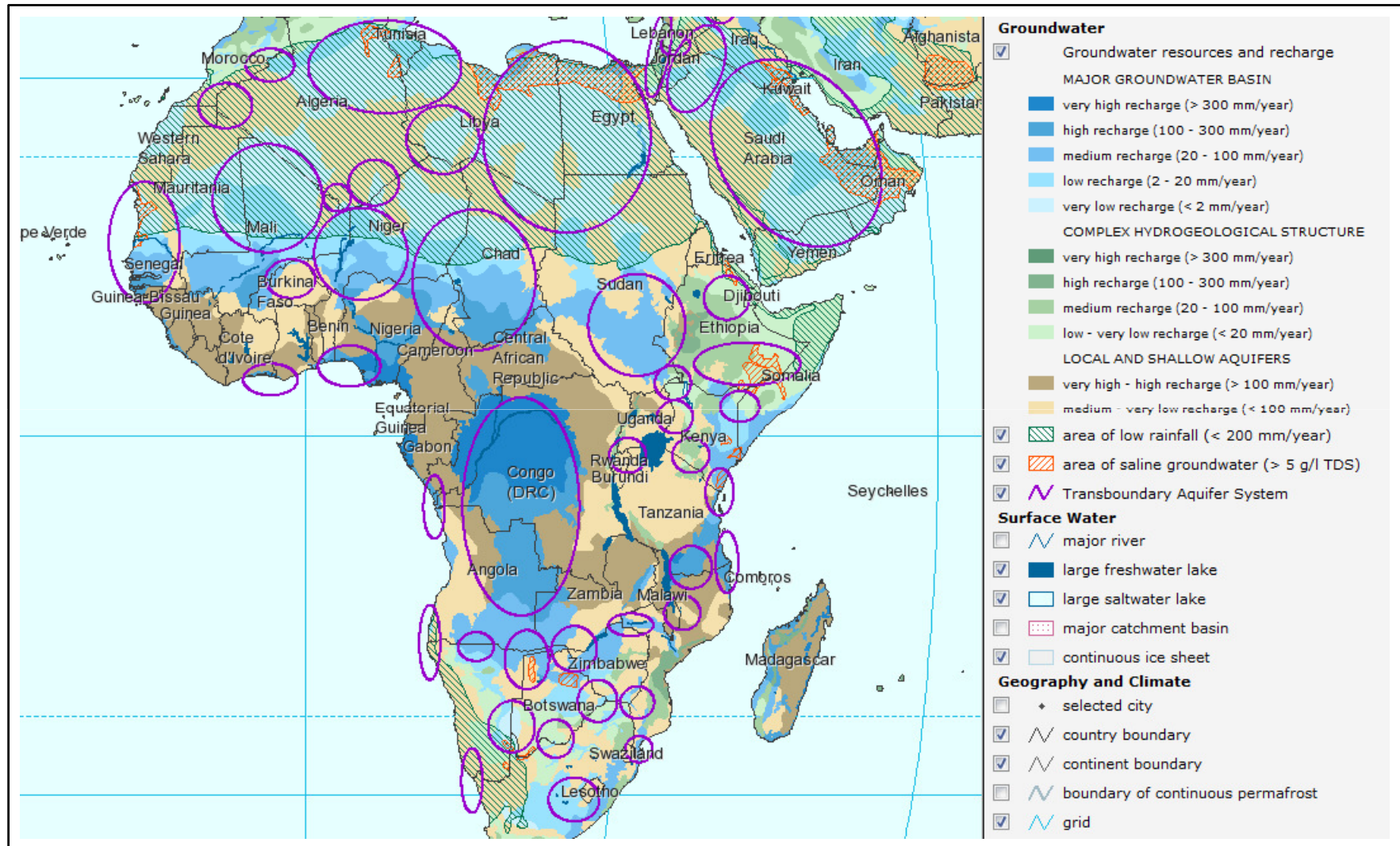


BfW, 2010

# Weltkarte der Grundwasserressourcen, Whymap

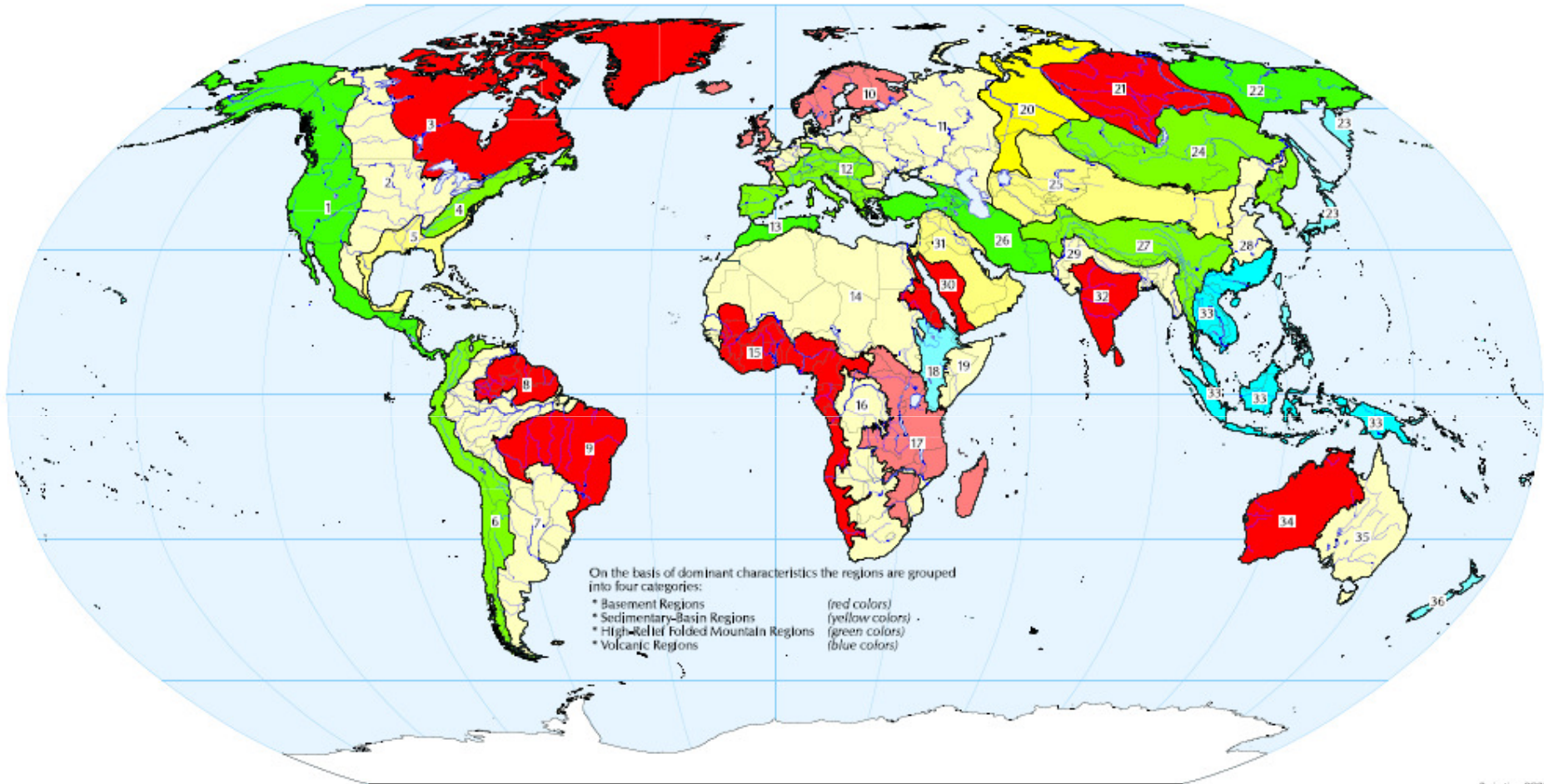


# Weltkarte der Grundwasserressourcen, Whymap





# Weltkarte der Grundwasserressourcen, Whymap



IC / UNESCO

Projection: ROBINSON  
Spheroid: WGS84  
Central meridian: 0°

<http://www.igrac.net/publications/119>

$$S_s = \frac{\Delta V}{V \cdot \Delta h}$$

und

$$S = b S_s$$

mit

$S_s$  = spezifischer Speicherkoeffizient (*engl. storage coefficient*)

$S$  = Speicherkoeffizient (*engl. storativity*) [ = O (0,005) ]

$V$  = Volumenelement

$\Delta V$  = zusätzlich (ent) (ge) gespeichertes Wasservolumen

$\Delta h$  = Standrohrspiegelhöhenänderung im Volumenelement  $V$

$b$  = Mächtigkeit des Aquifers