

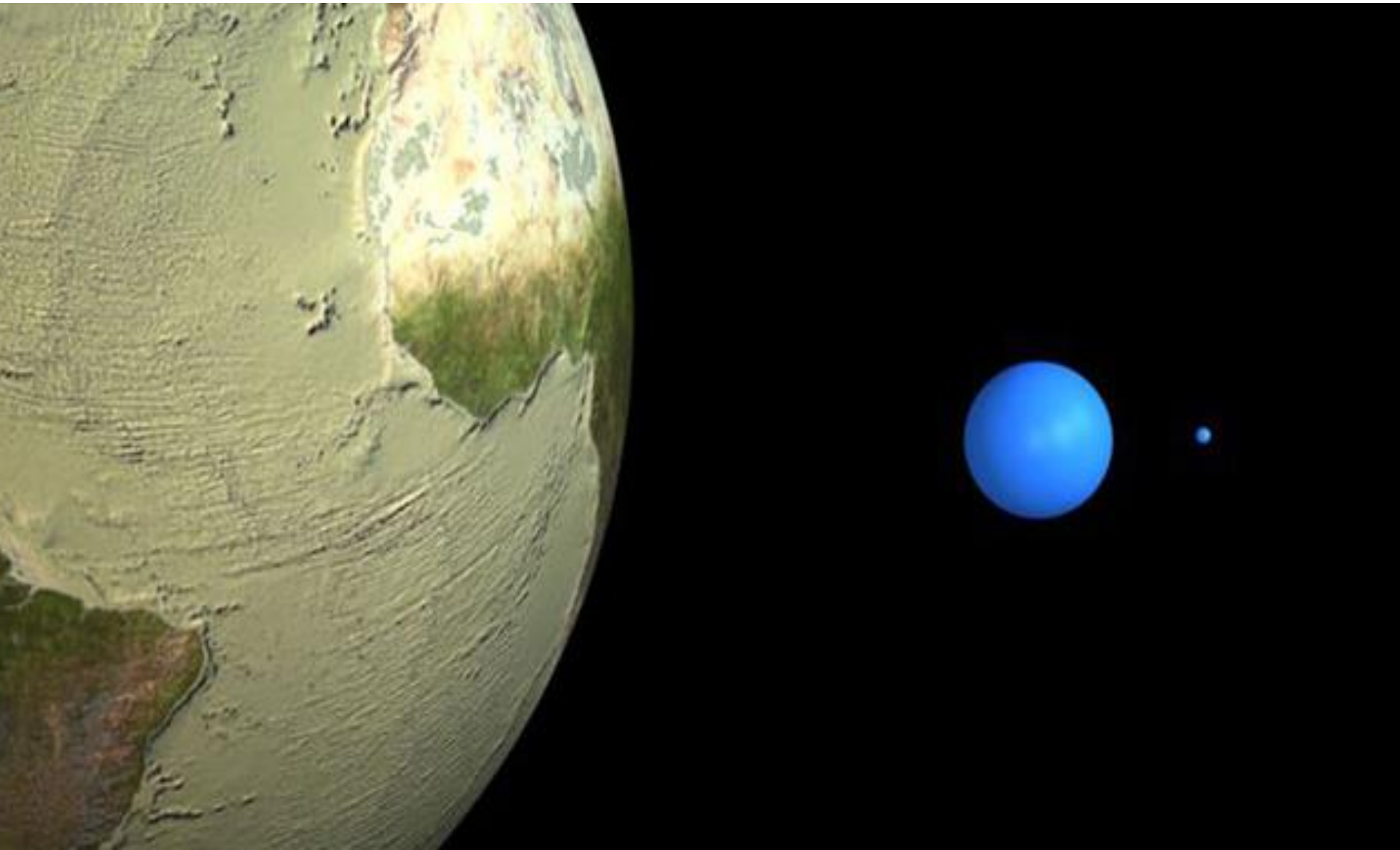


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4TH FORUM ON THE CLIMATE- ENERGY SECURITY NEXUS: **WATER & ENERGY**

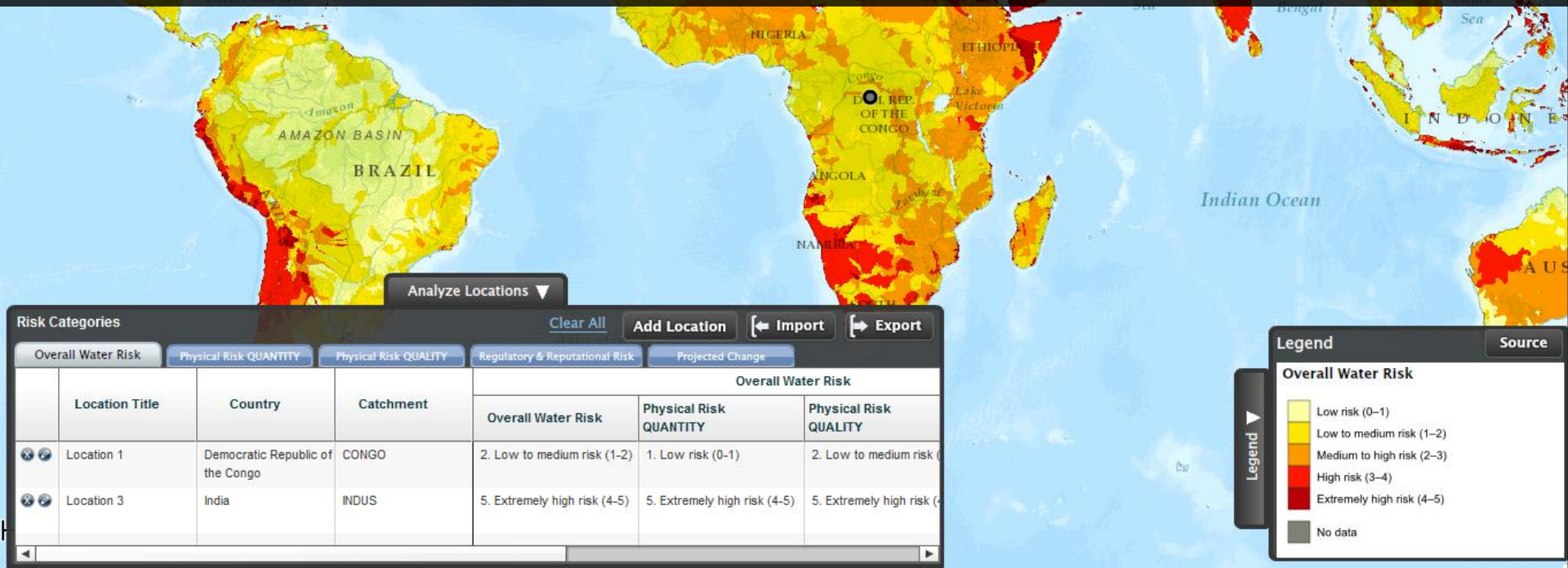
*Modeling Challenges in Understanding the
Climate Change Water-Energy Nexus*

FRESHWATER SCARCITY





Aqueduct water risk atlas



MEASURING AND MAPPING WATER RISKS

MAPS AND DATA:

- Surface water supply and demand by sector:
industry, agriculture, municipalities
- Groundwater (where it is being overdrafted relative to supply)
- Water supply variability
- Historic flood and drought occurrences
- Upstream water storage capacity
- Total of 12 indicators on water related risk

Projections of water stress and flood risk for 2020, 2030, 2040

All data for 15,000 catchments globally

WATER PROGRAM PARTNERS



Kingdom of the Netherlands



The Government
of Denmark



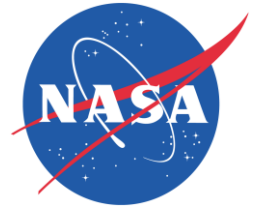
SWEDEN



ADM CAPITAL



Bloomberg



Confederation of Indian Industry

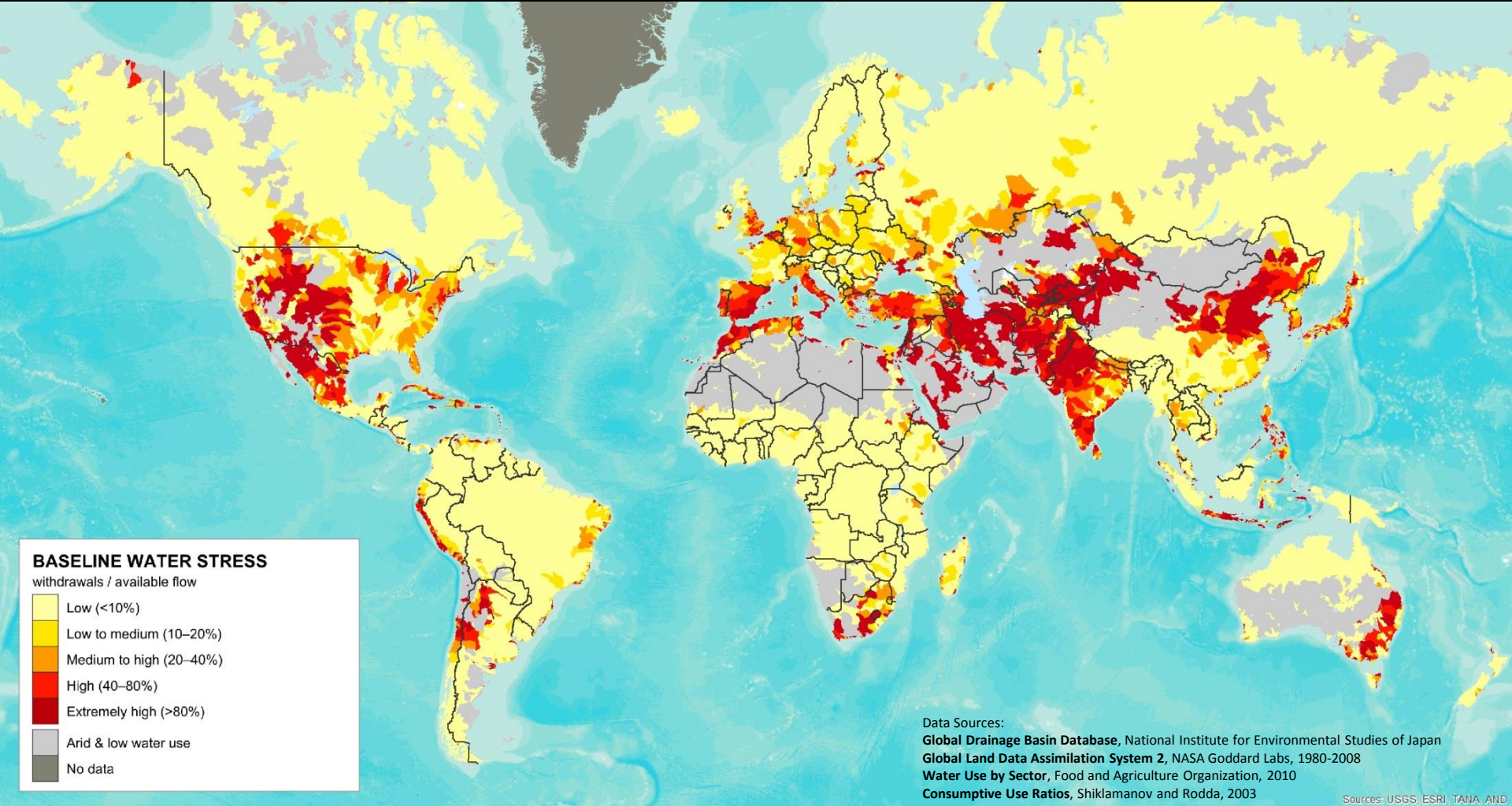


AQUEDUCT CORPORATE USERS



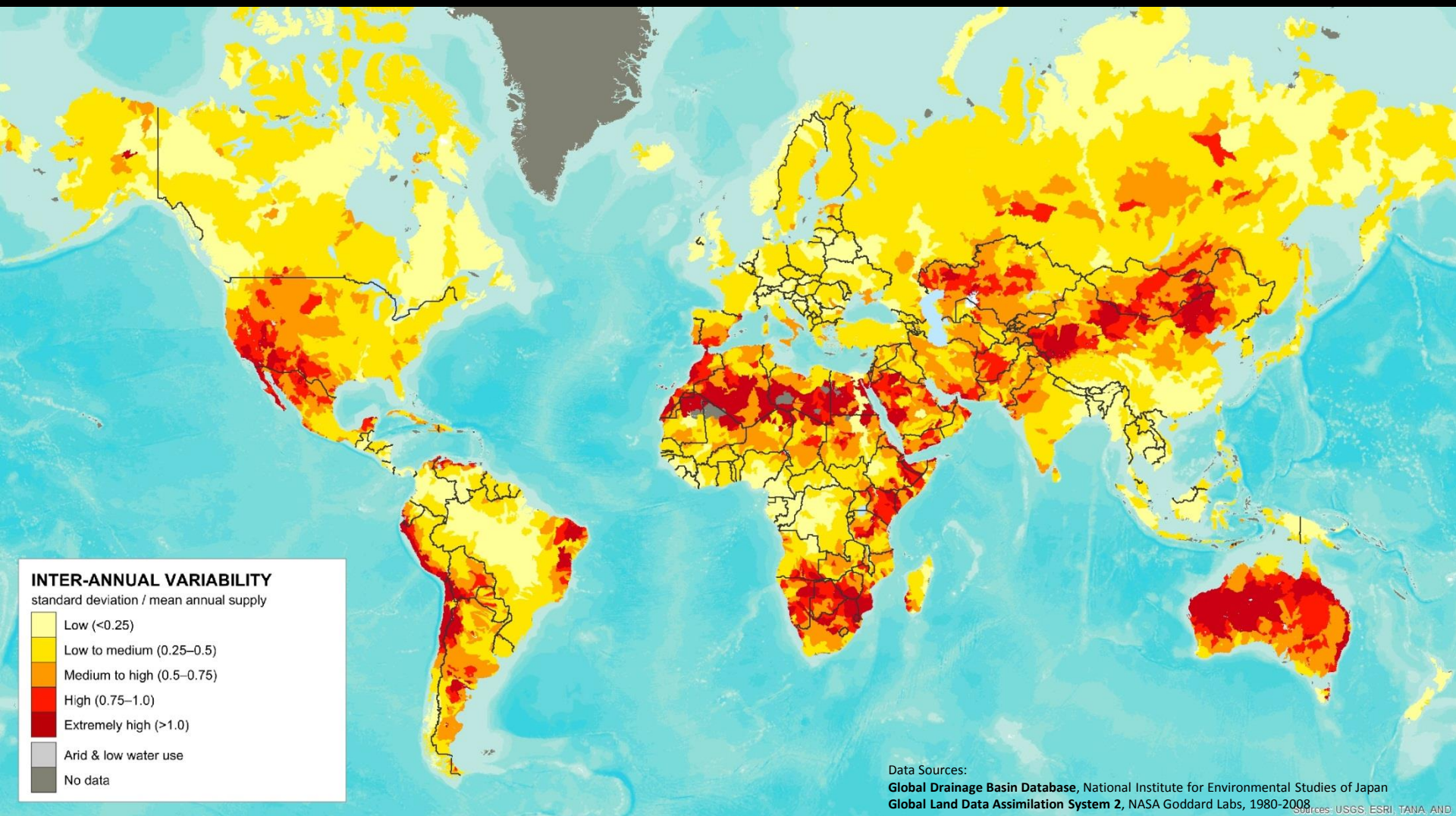
BASELINE WATER STRESS

total annual water withdrawals (municipal, industrial, and agricultural) expressed as a percent of the total annual available flow; higher values indicate more competition among users



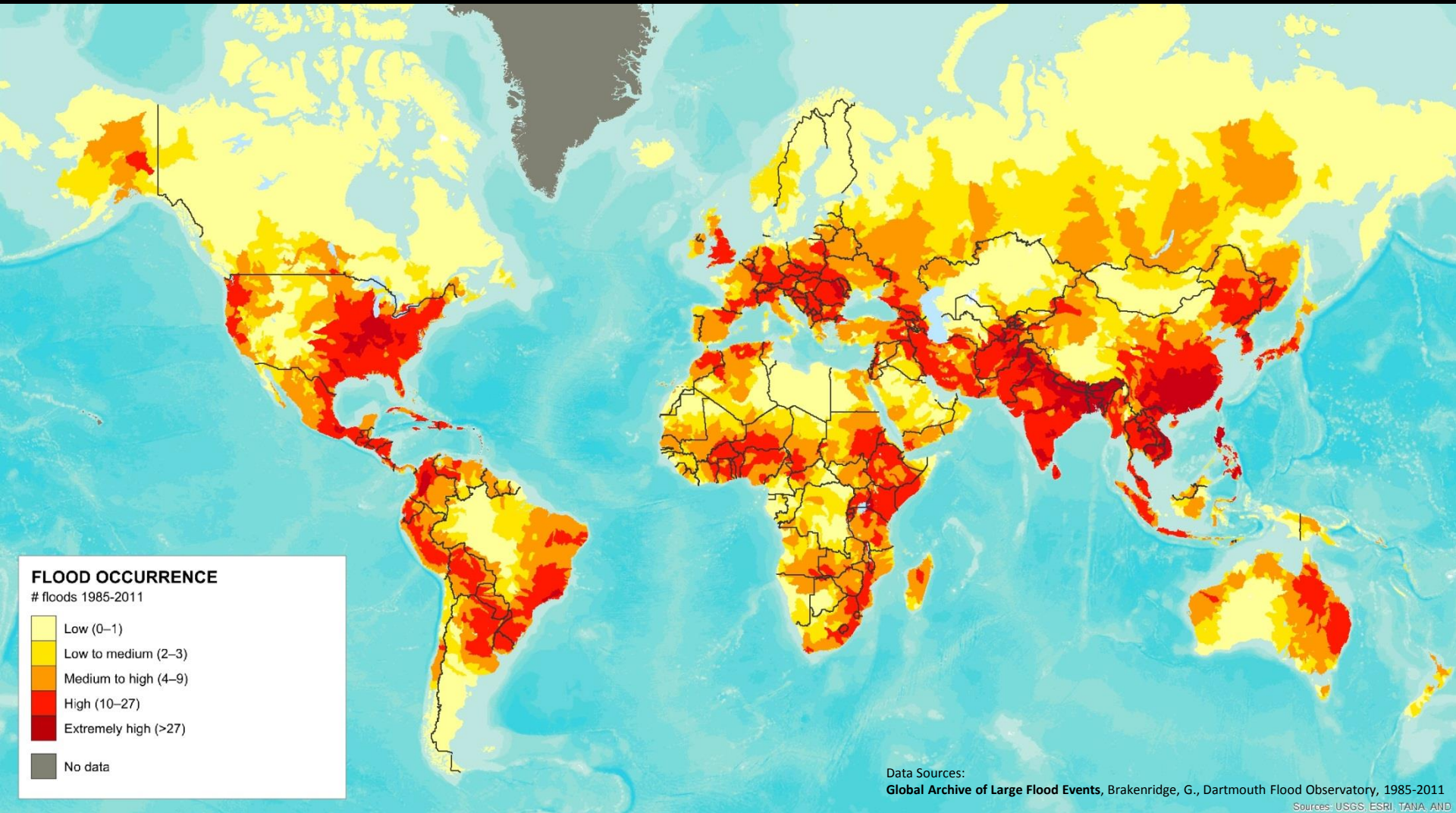
INTER-ANNUAL VARIABILITY

variation in water supply from year-to-year



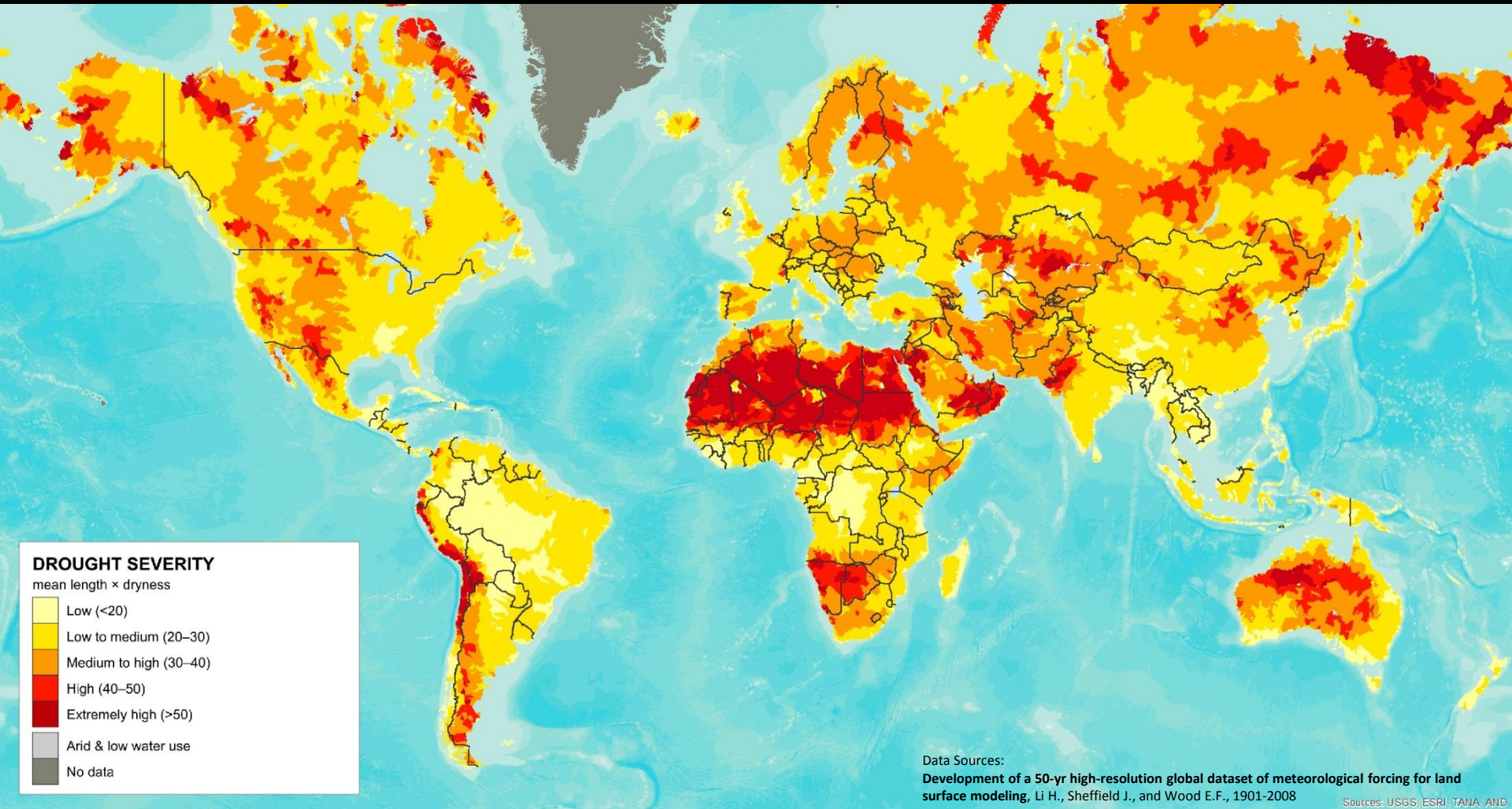
FLOOD OCCURRENCE

count of the number of floods recorded from 1985 to the present date



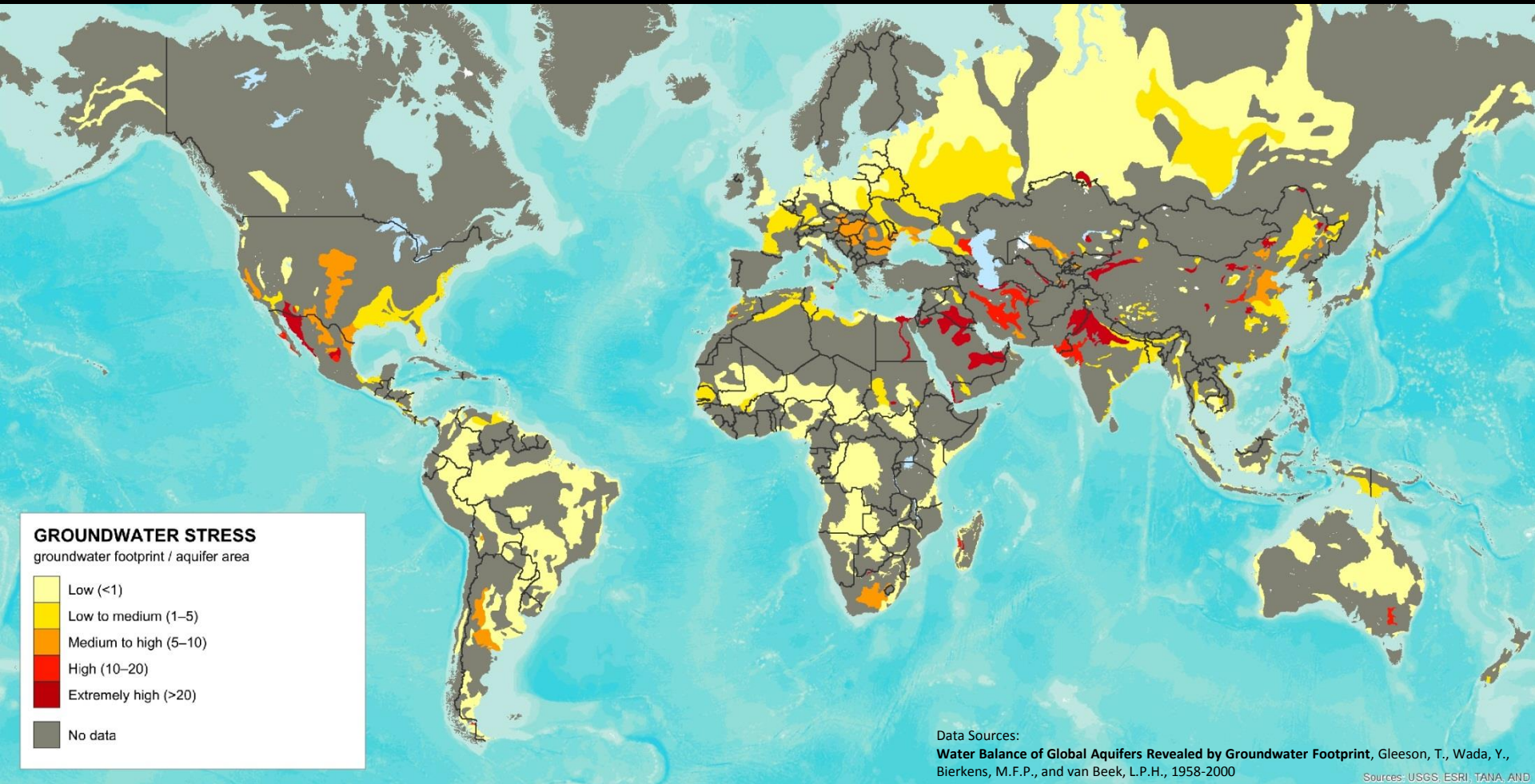
DROUGHT SEVERITY

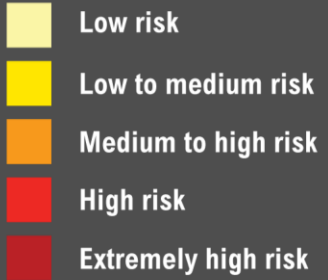
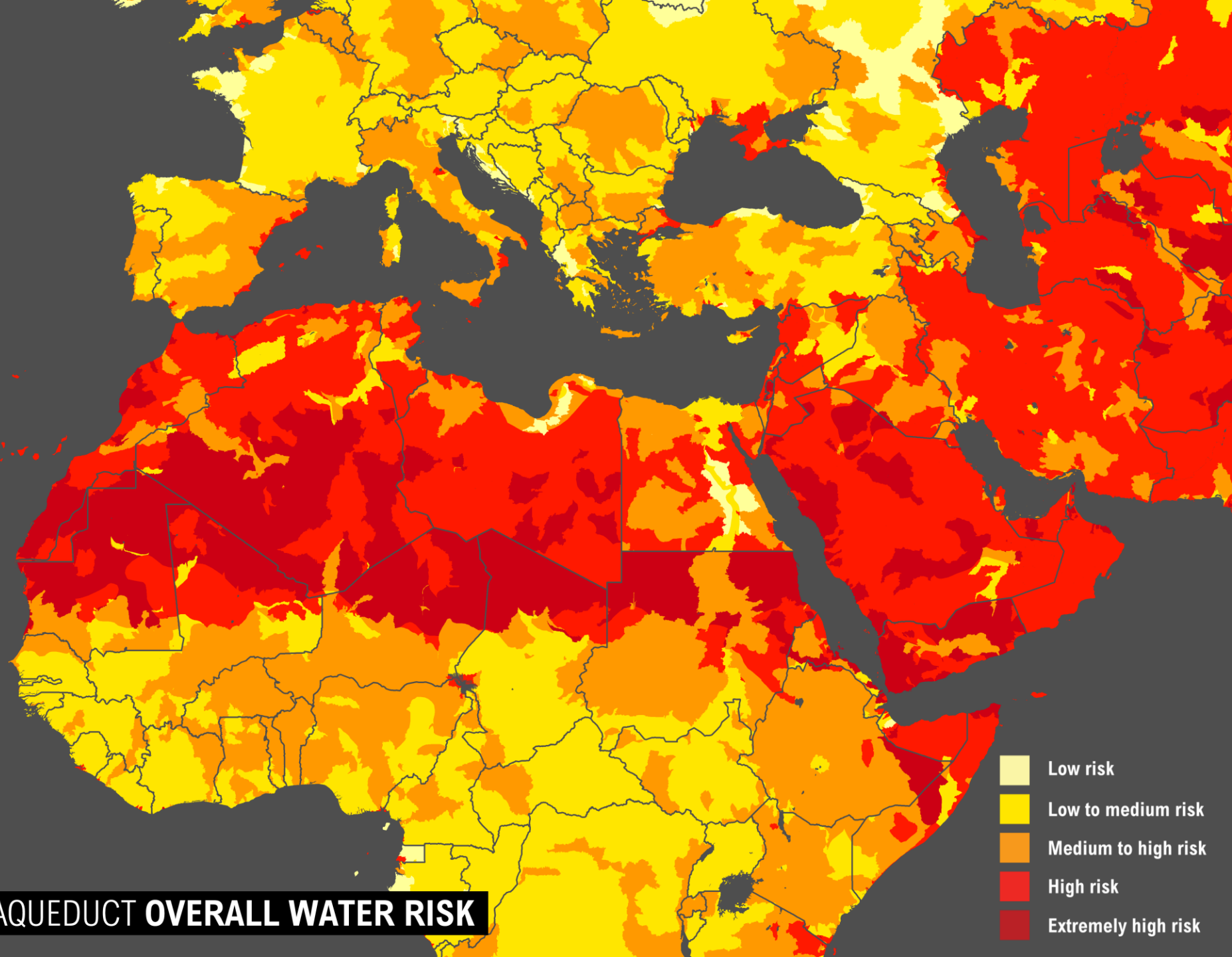
average length times dryness of droughts from 1901 to 2008 (drought is defined as a contiguous period where soil moisture remains below the 20th percentile)



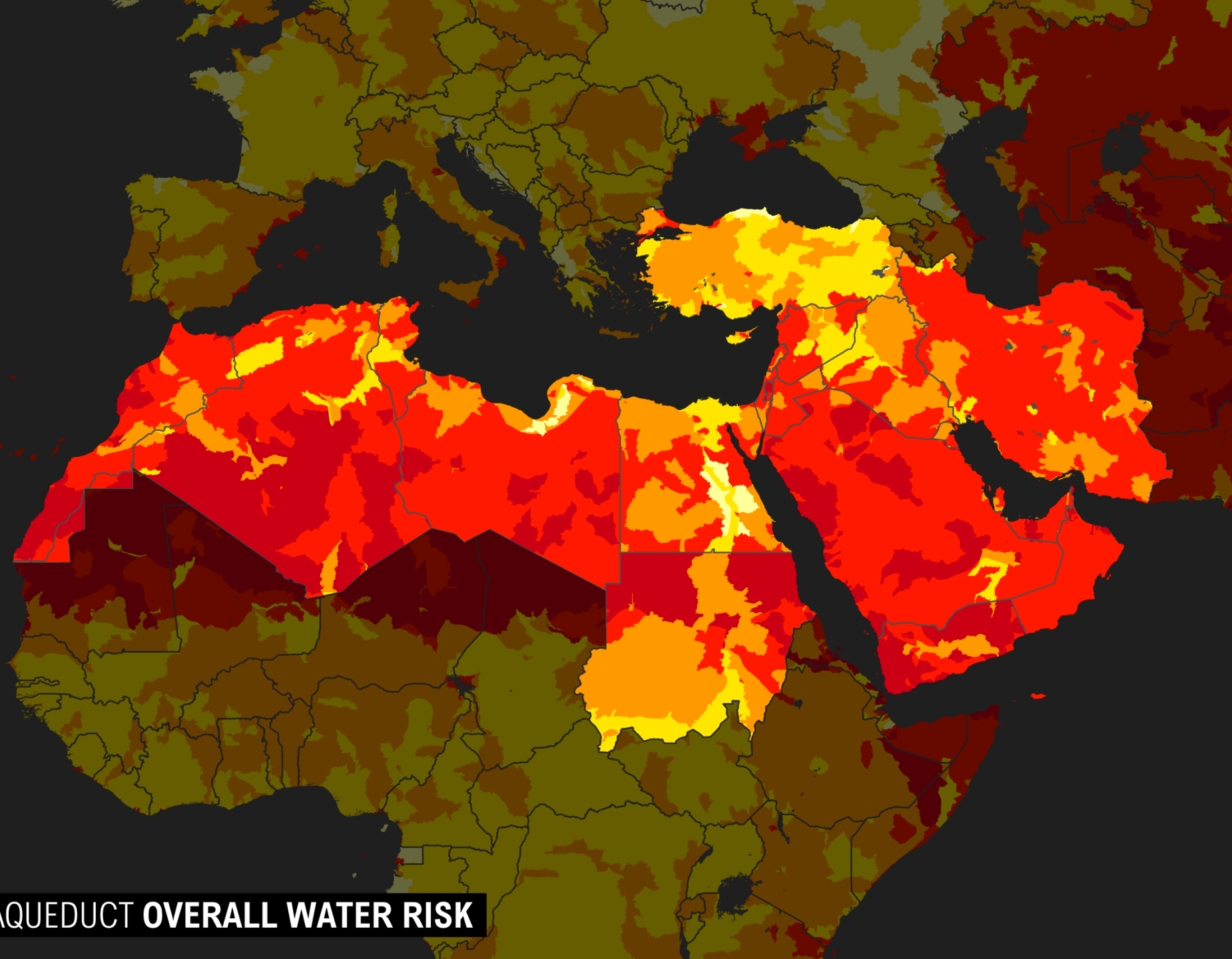
GROUNDWATER STRESS

the ratio of groundwater withdrawal relative to the recharge rate to aquifer size; values above one indicate where unsustainable consumption could affect groundwater availability and dependent ecosystems



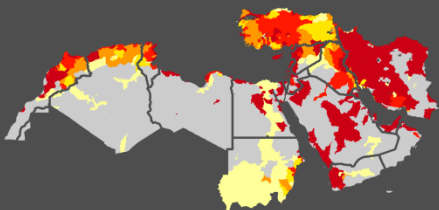


AQUEDUCT OVERALL WATER RISK

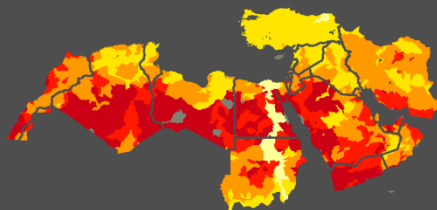


AQUEDUCT OVERALL WATER RISK

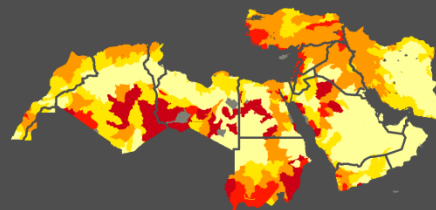
No data Misc Low Low to medium Medium to high High Extremely high



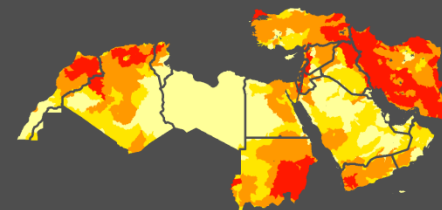
Baseline Water Stress



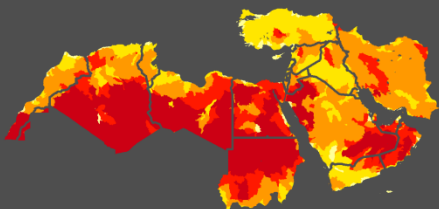
Inter-annual Variability



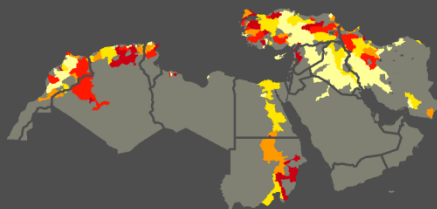
Seasonal Variability



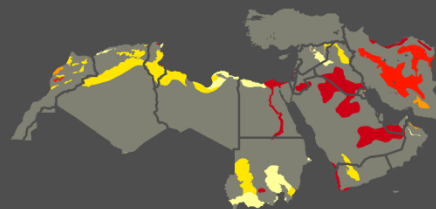
Flood Occurrence



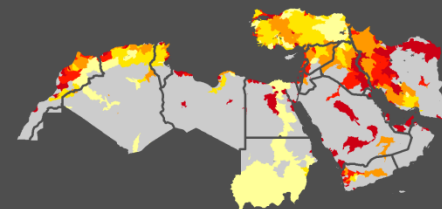
Drought Severity



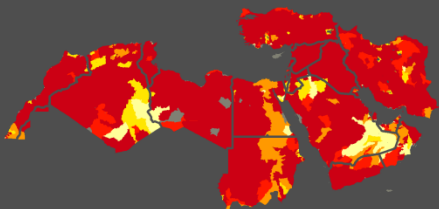
Upstream Storage



Groundwater Stress



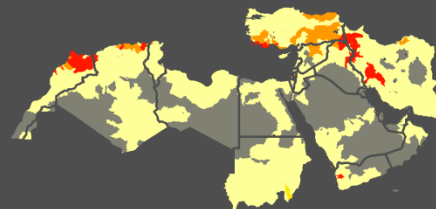
Return Flow Ratio



Upstream Protected Land



Media Coverage



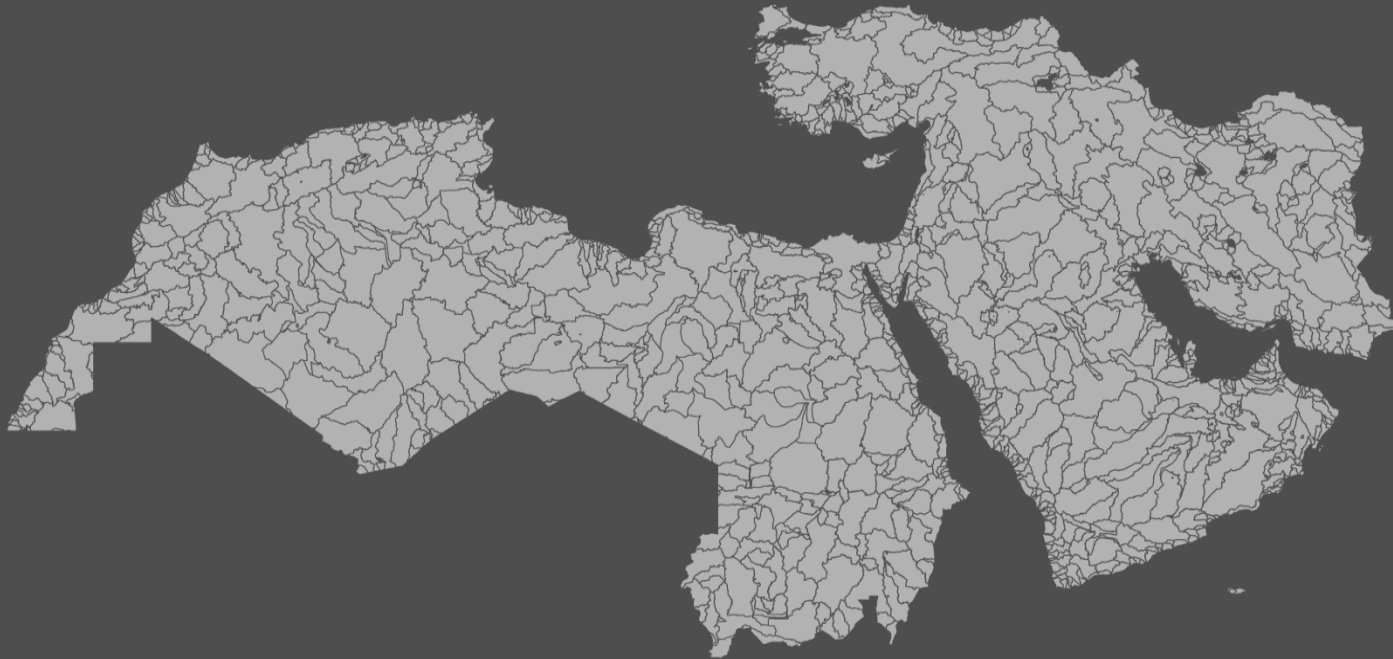
Threatened Amphibians

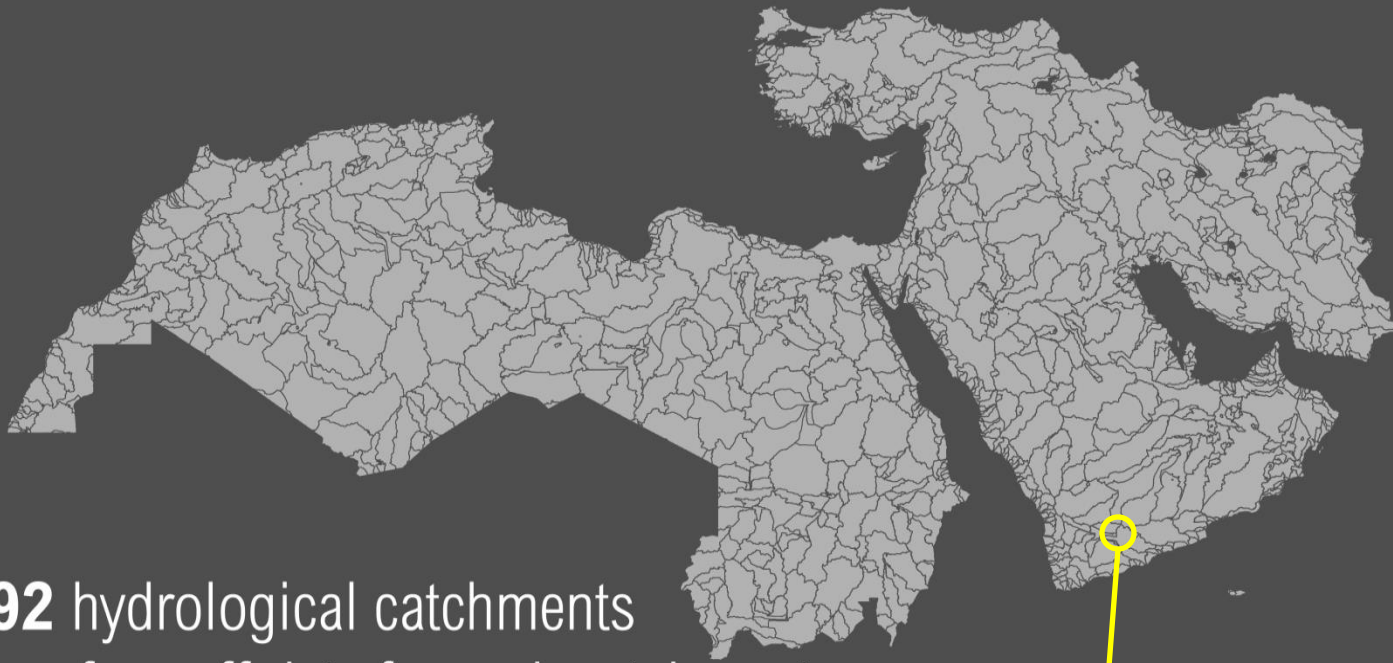


Access to Water

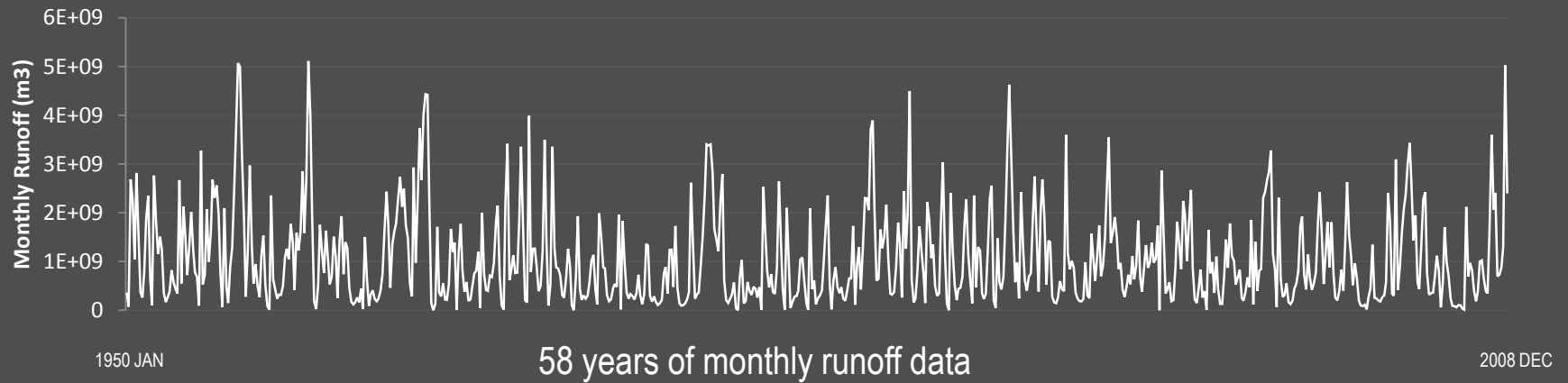


1392 hydrological catchments





1392 hydrological catchments
696 months of runoff data for each catchment



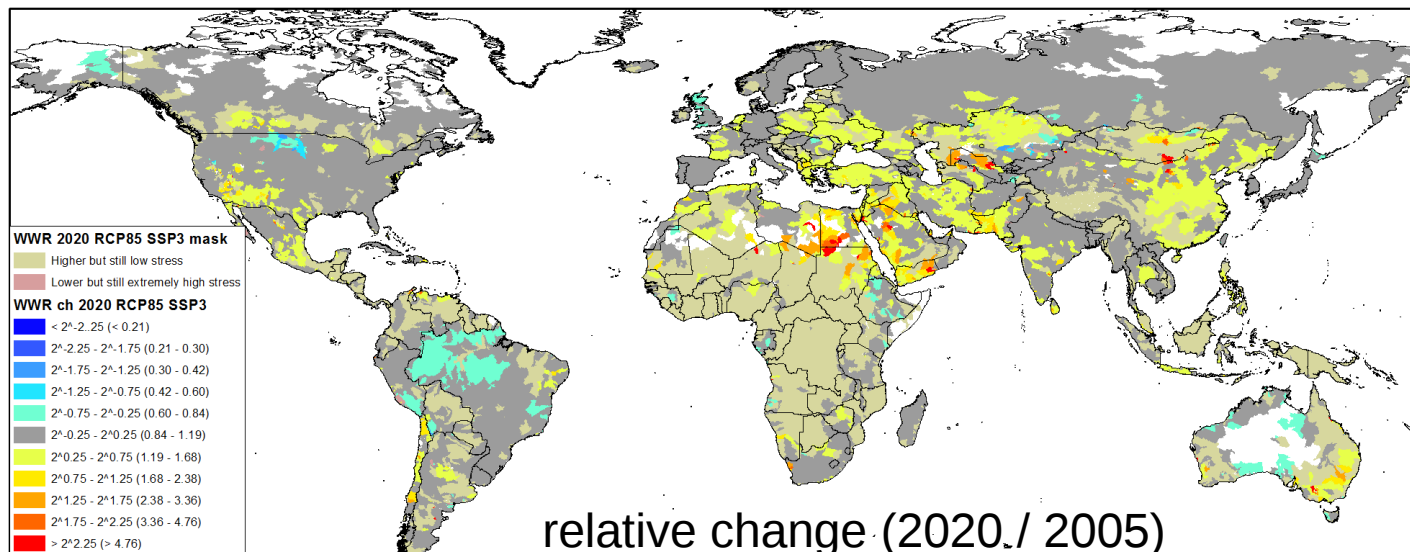
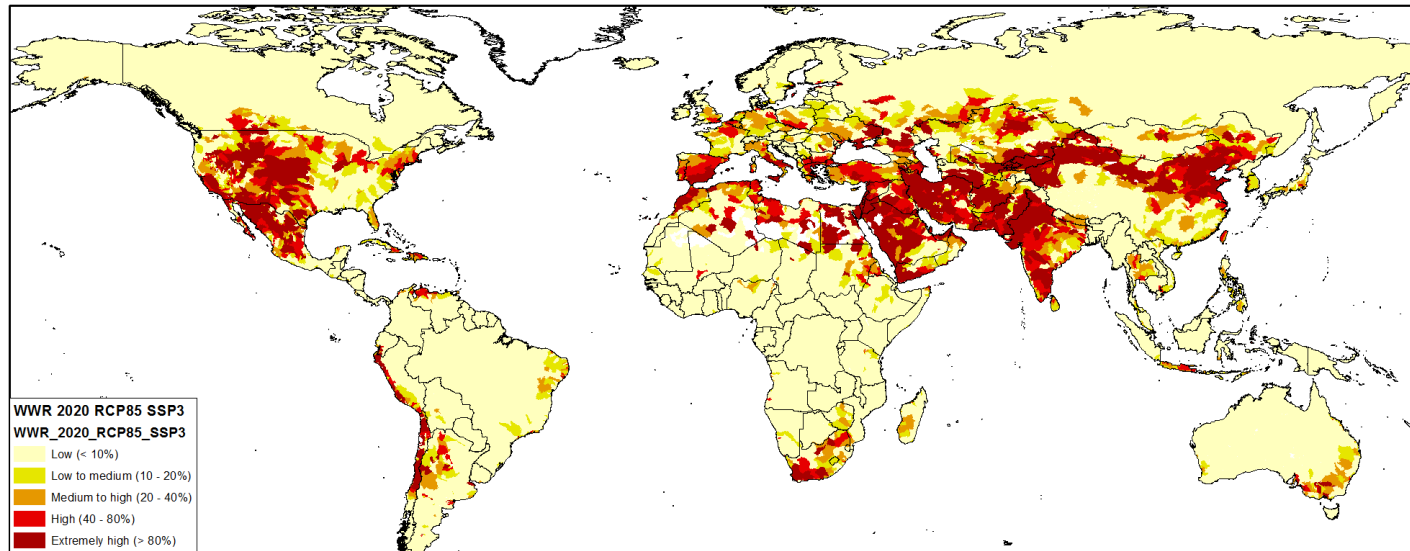
WATER STRESS & CLIMATE

Projected Change in Water Stress Maps

- **Objective:**
 - Plausible scenarios of future water stress
 - Based on expected climatic and socioeconomic changes
- **Intended audience:**
 - Corporate strategists
 - National and regional policy-makers
 - Multi-lateral development banks
- **Intended use:**
 - Evaluate long-term business risks and opportunities
 - Evaluate regional water-related risks and adaptation strategies
 - Prioritize investments and policy interventions
 - Not intended for site-specific assessment

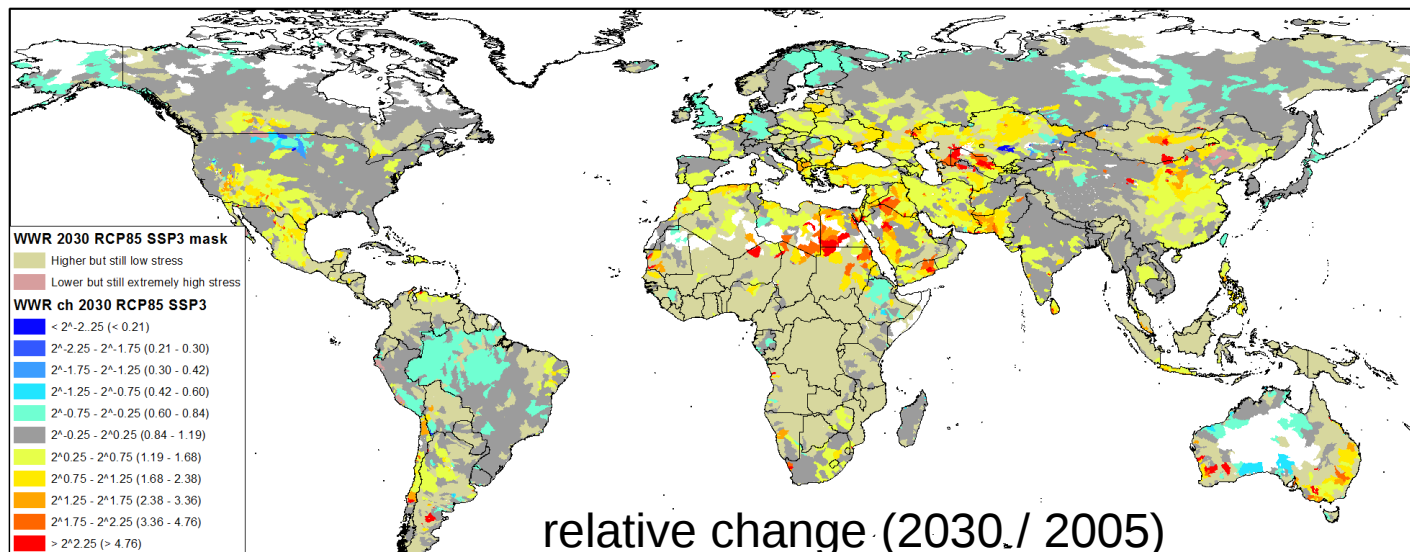
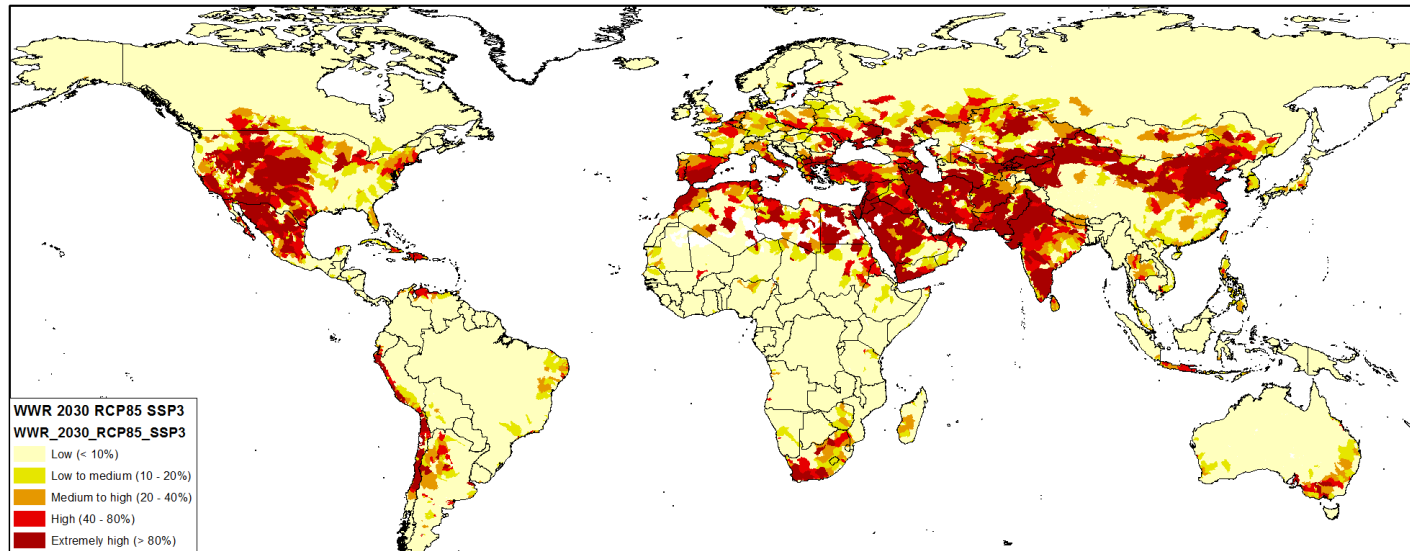
WATER STRESS (RCP85/SSP3) 2020

DRAFT



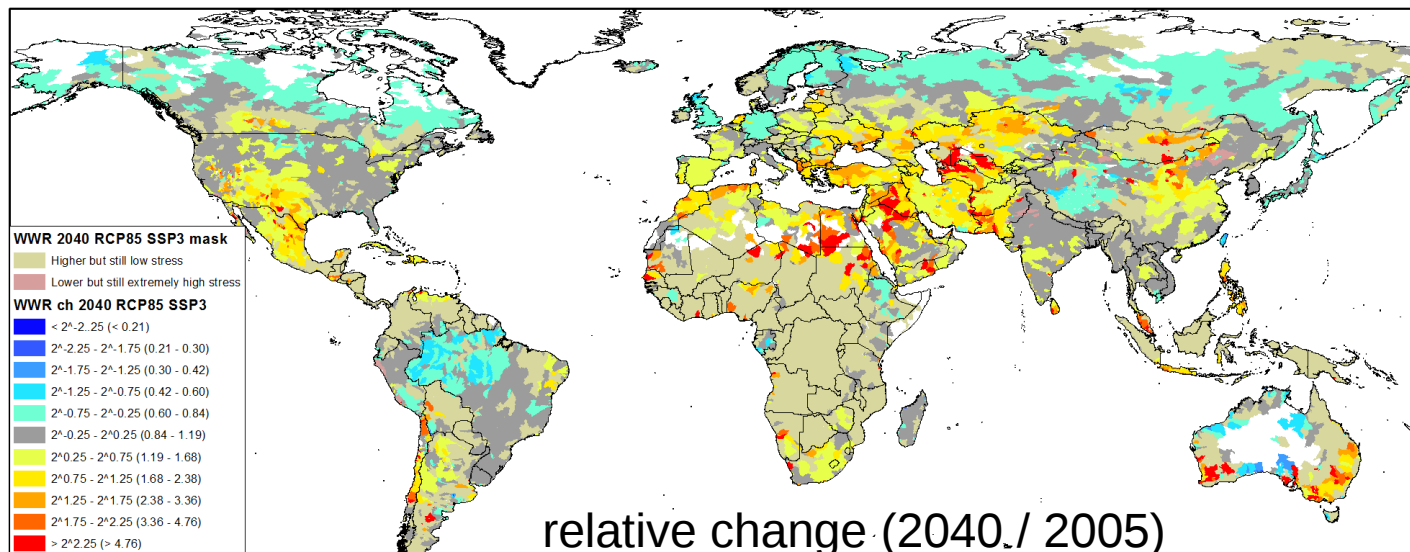
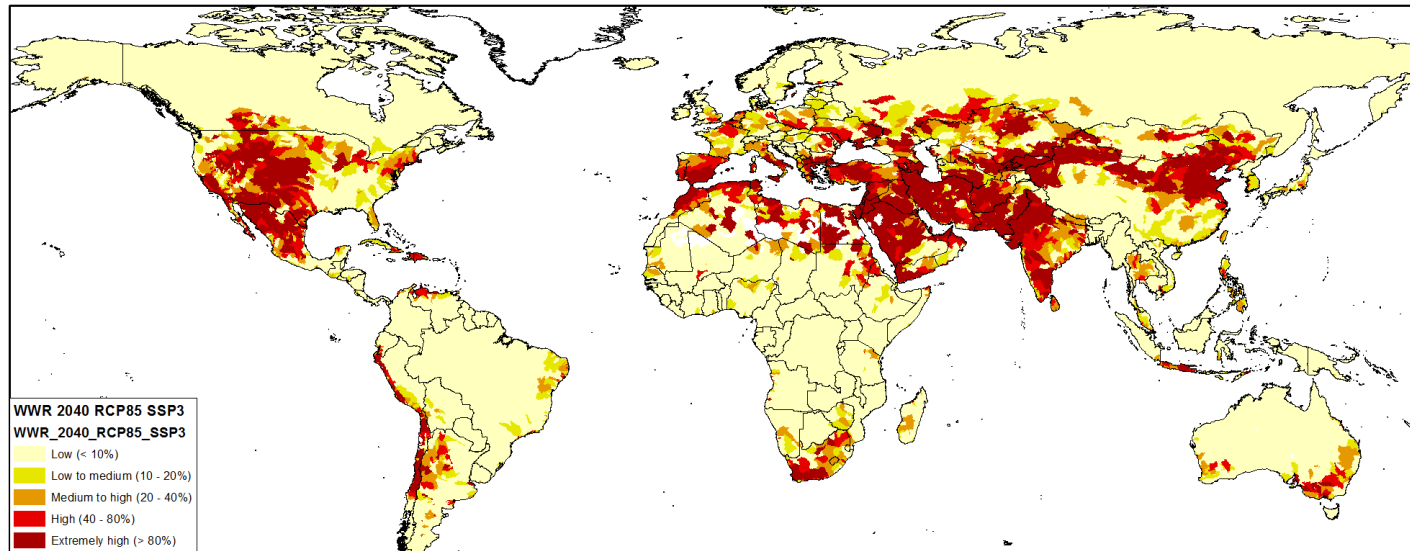
WATER STRESS (RCP85/SSP3) 2030

DRAFT



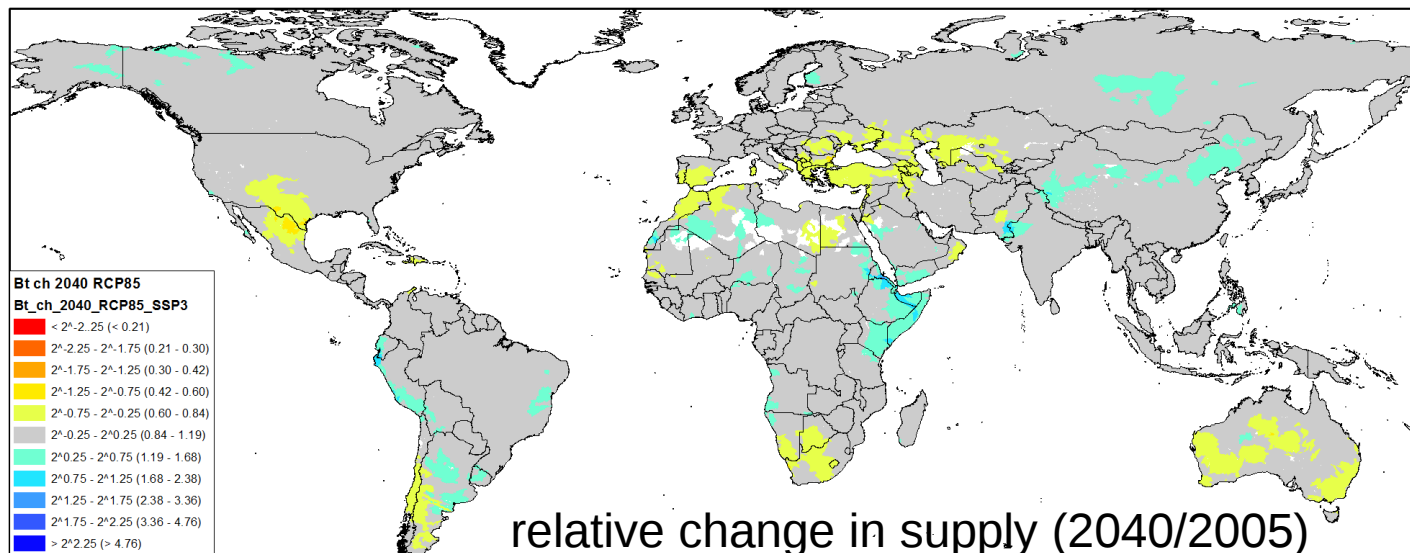
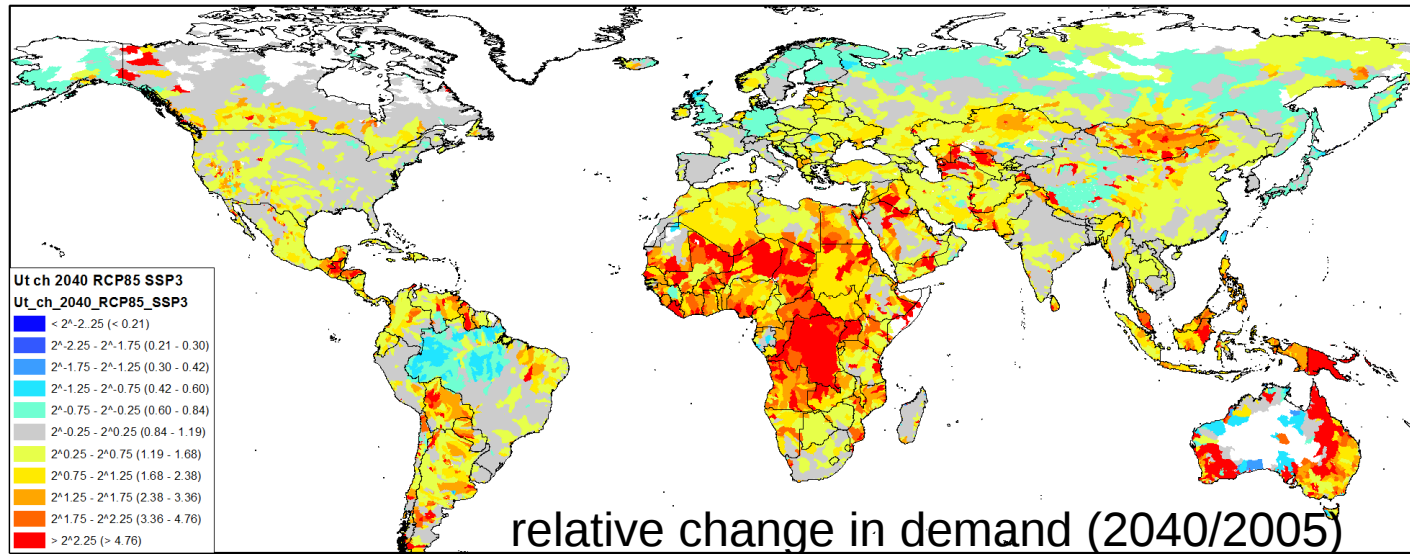
WATER STRESS (RCP85/SSP3) 2040

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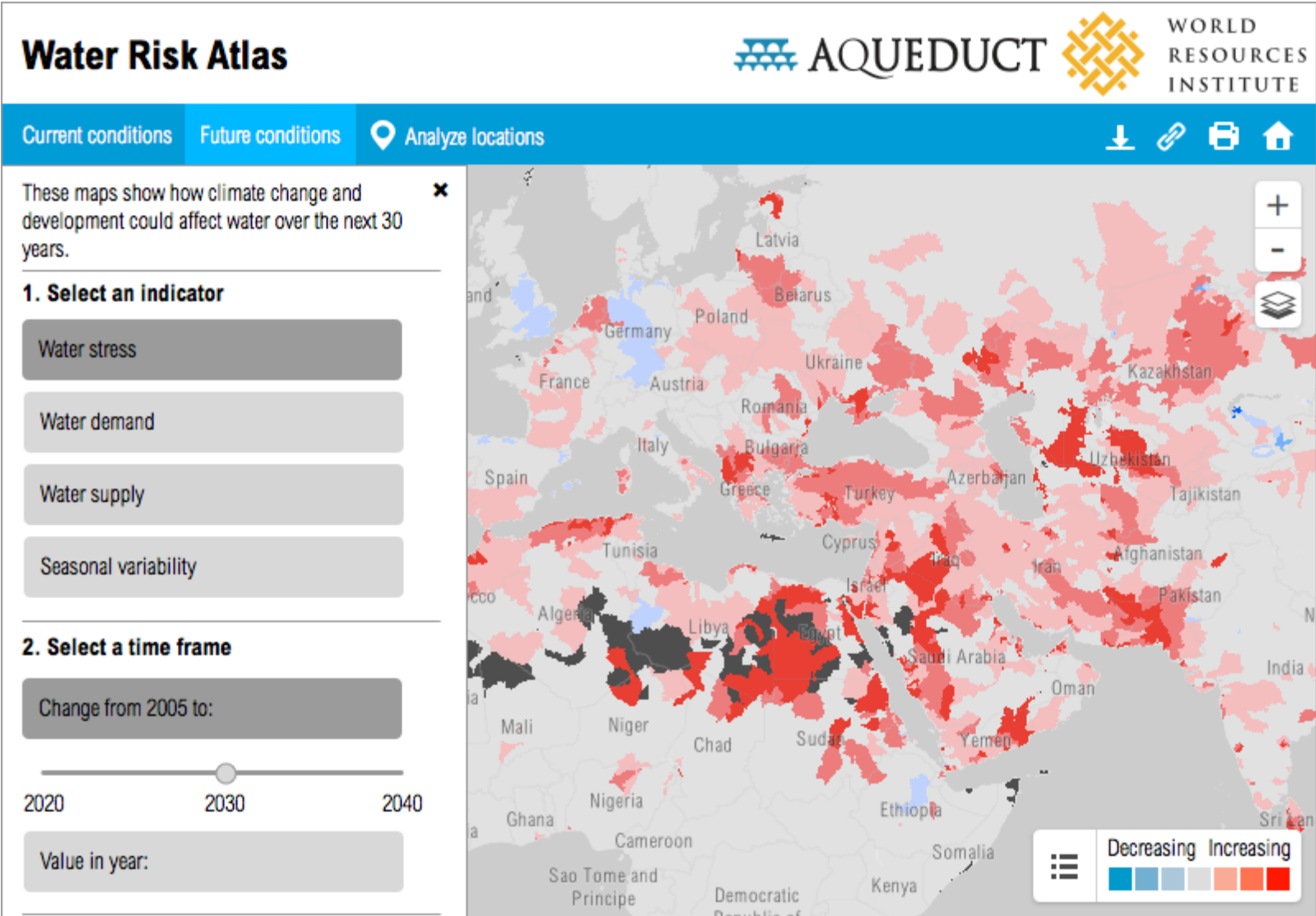
RELATIVE CHANGE IN SUPPLY & DEMAND

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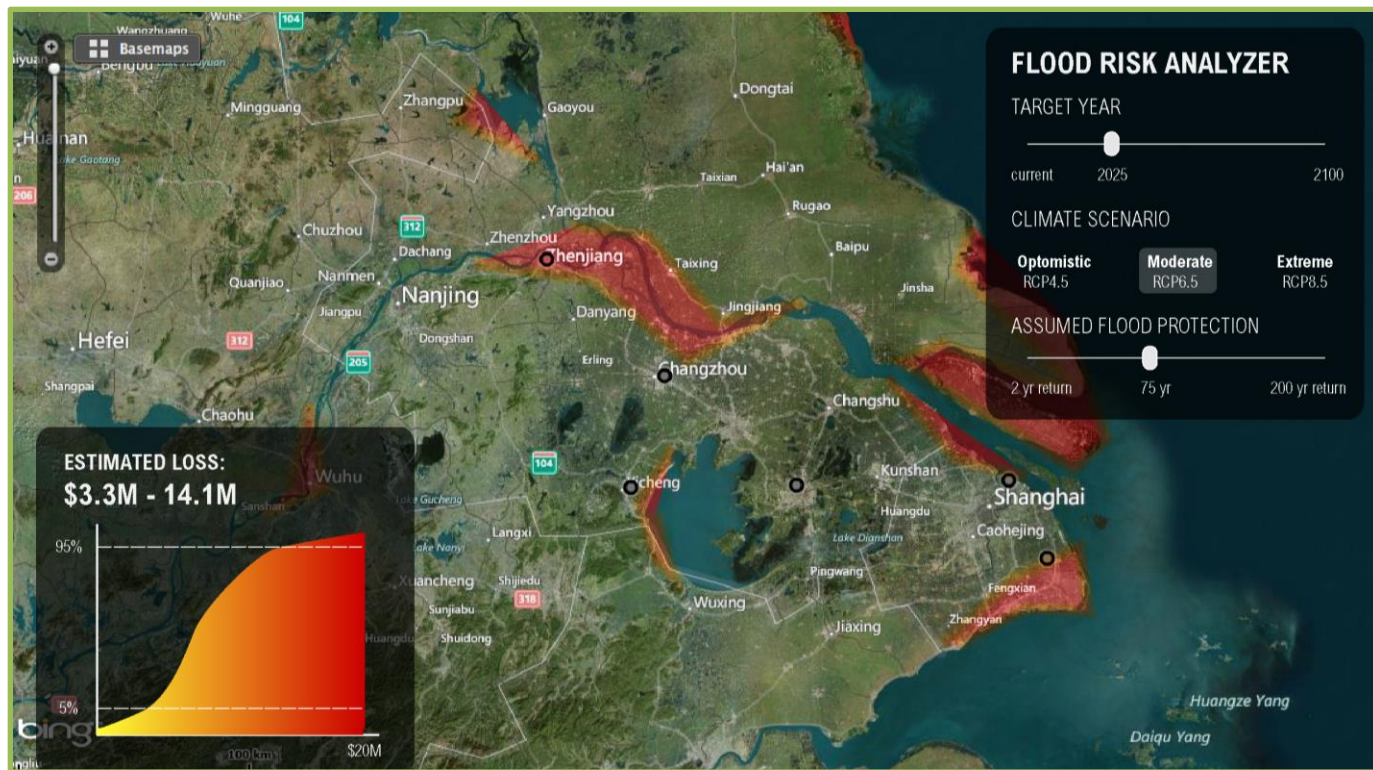
Aqueduct Water Risk Atlas

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RIVER FLOOD PROJECTIONS (Proposed collaboration with Deltares, VU University Amsterdam, Utrecht University, and PBL)

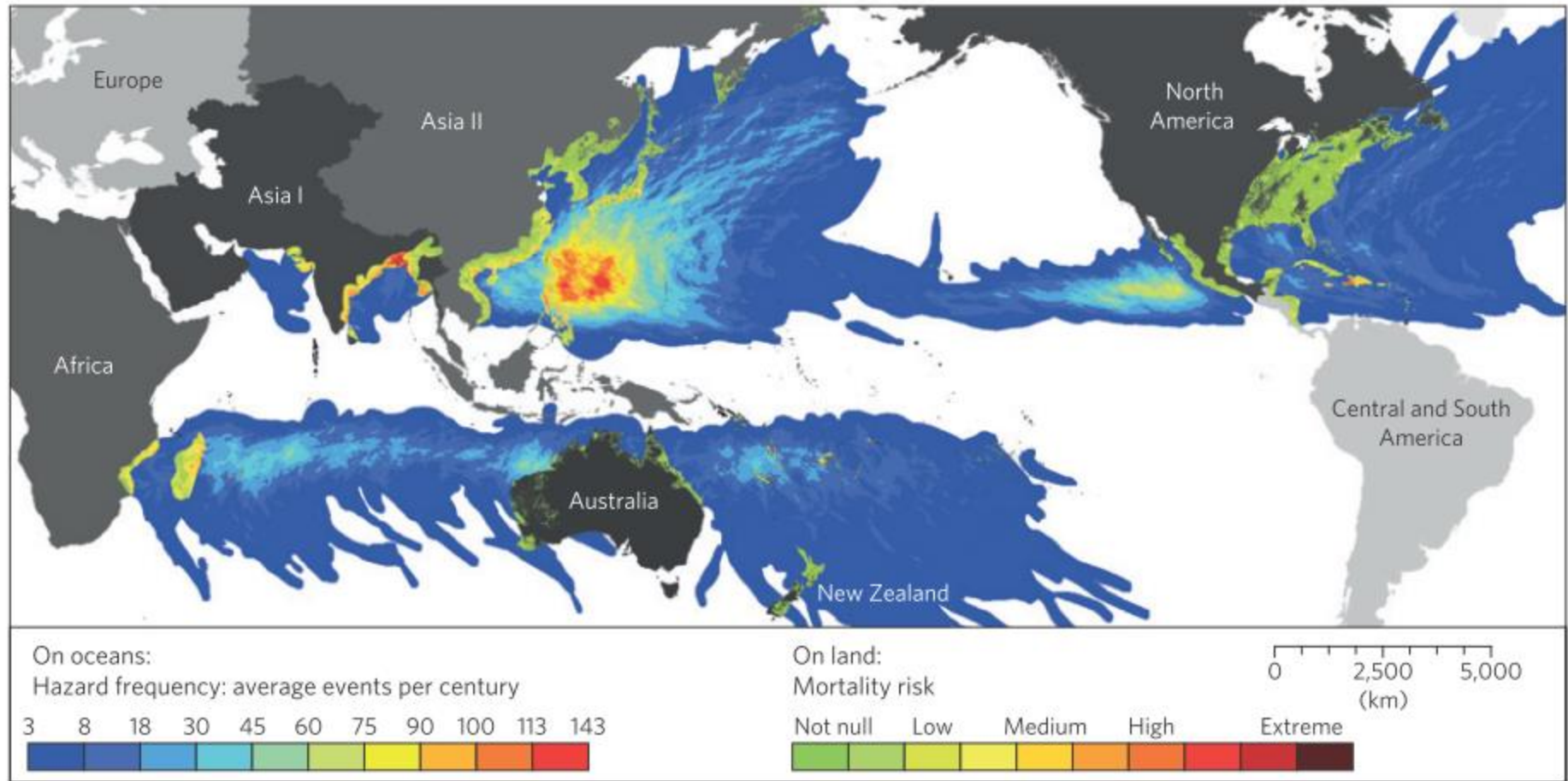
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Global indicators of flood risk under current and future climate and socio-economic conditions.

STORM SURGE MODELLING (Proposed collaboration with Deltares, VU University Amsterdam, Utrecht University, and PBL)

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IVM Institute for
Environmental Studies



Universiteit Utrecht

Deltares
Enabling Delta Life