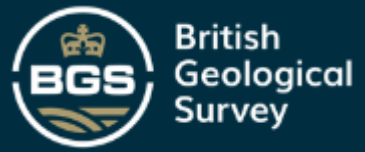




MATT ASCOTT, DAVID MACDONALD, EMILY BLACK, ANNE VERHOEF, PASCAL NAKOHOUN, et al

# Tools to reconstruct past and project future groundwater levels to inform groundwater resource management in sub-Saharan Africa



# Need for tools to simulate groundwater levels

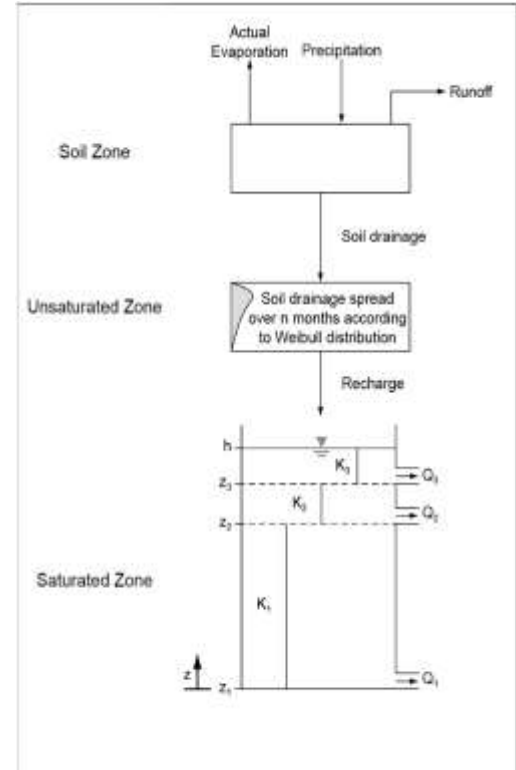
- Development of groundwater can support climate change adaptation in sub-Saharan Africa
- Need for tools quantify climate-driven changes in groundwater resources
- Contextualise current groundwater resource status
- Project future changes



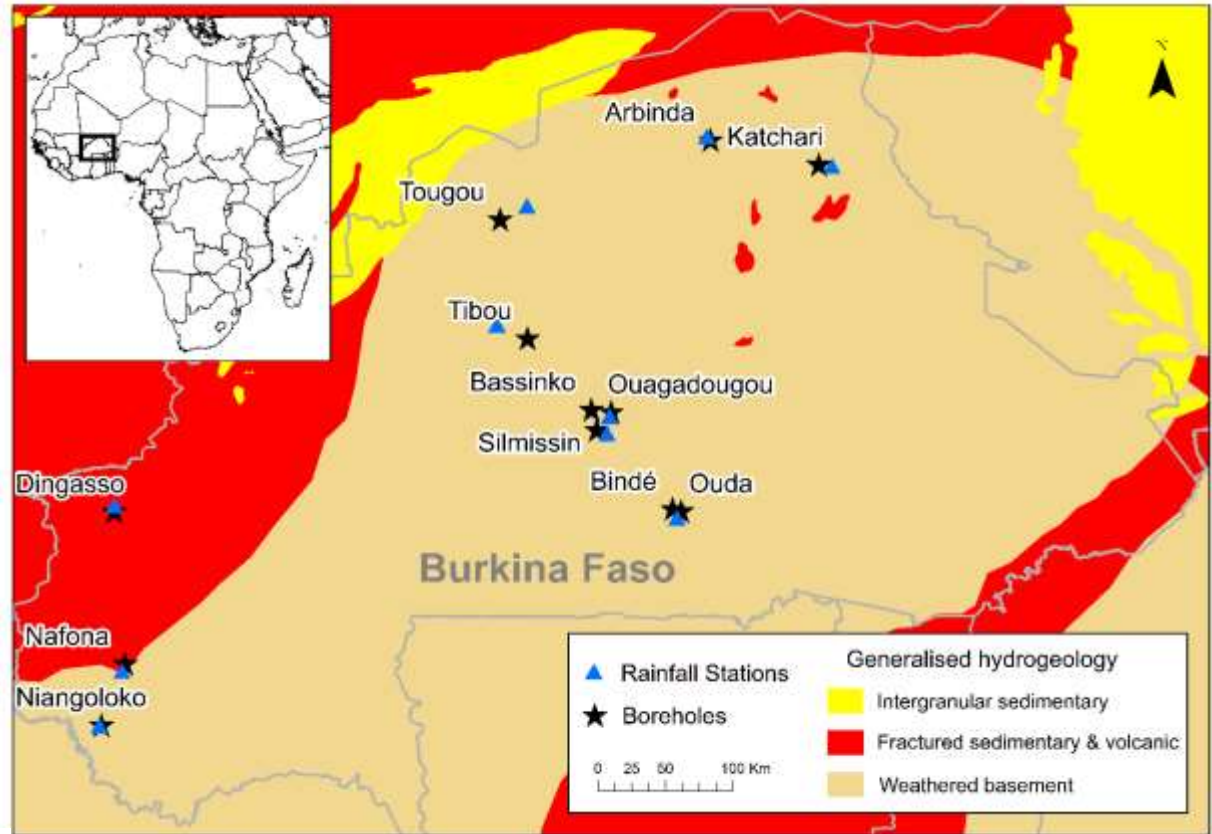
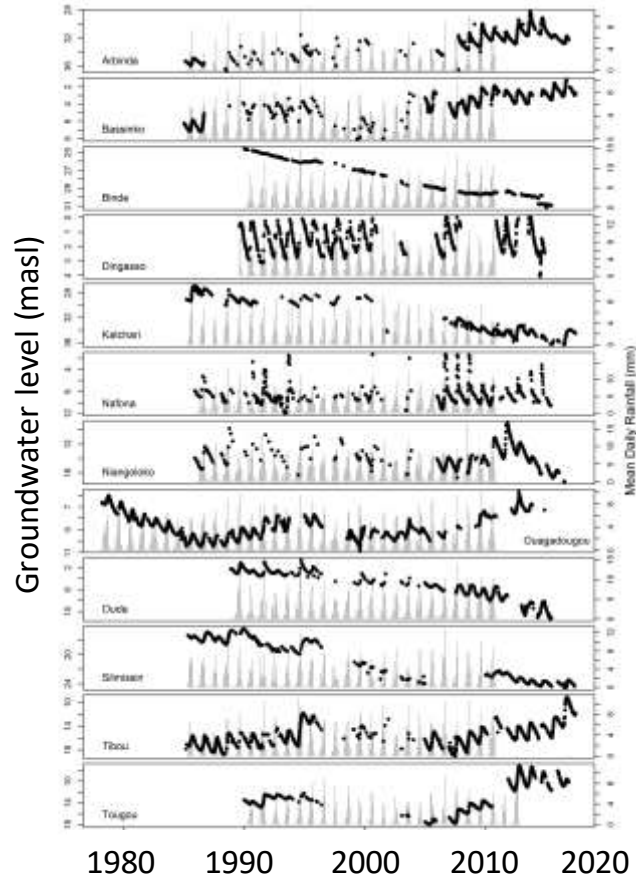
# Modelling approach

- Complex distributed models problematic
- Lumped parameter model with range of underlying linked simplistic conceptual models
- Input: climate and groundwater level data for an individual borehole
- Fitted using Monte Carlo approach
- Then use model with:
  - past observed climate data to reconstruct gwls
  - climate model outputs to project gwls

## AquiMod

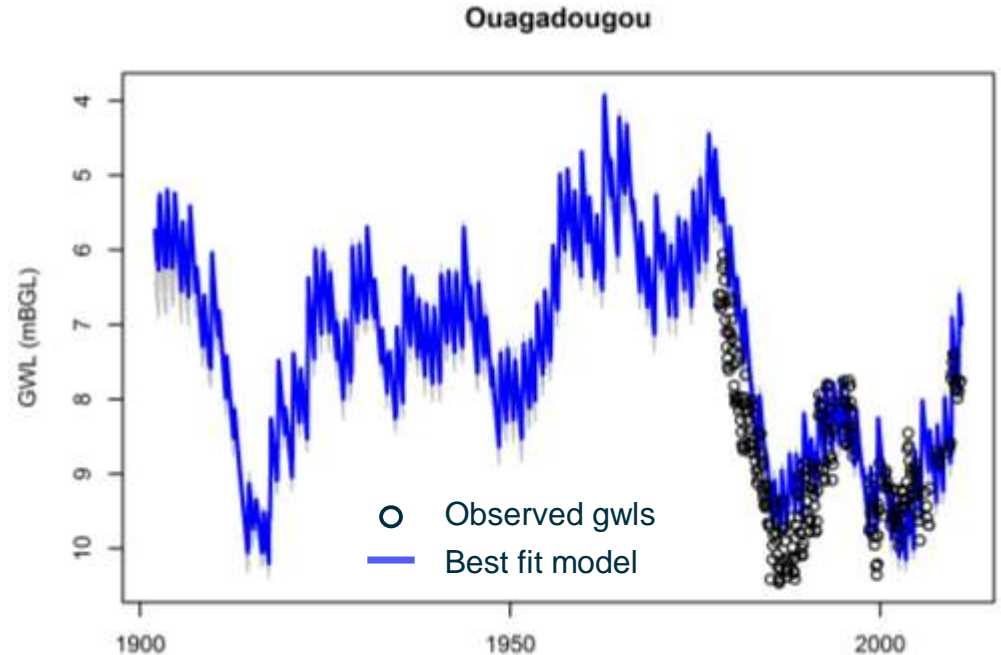


# Case study – Burkina Faso



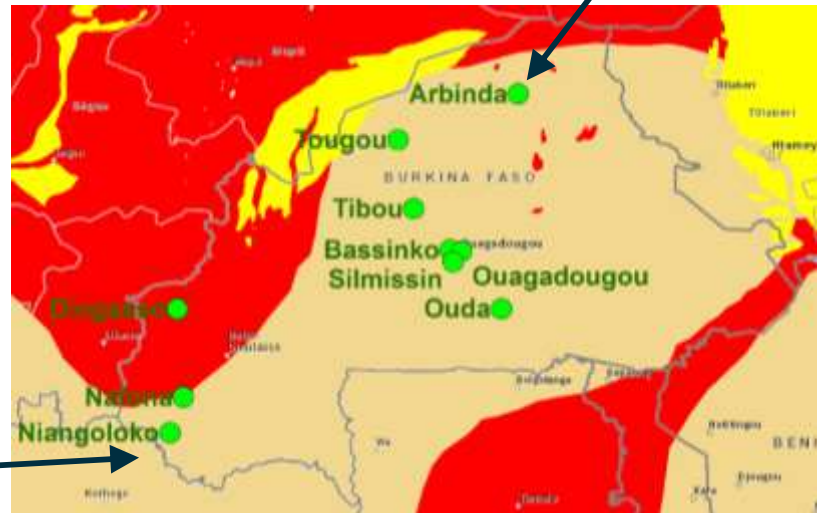
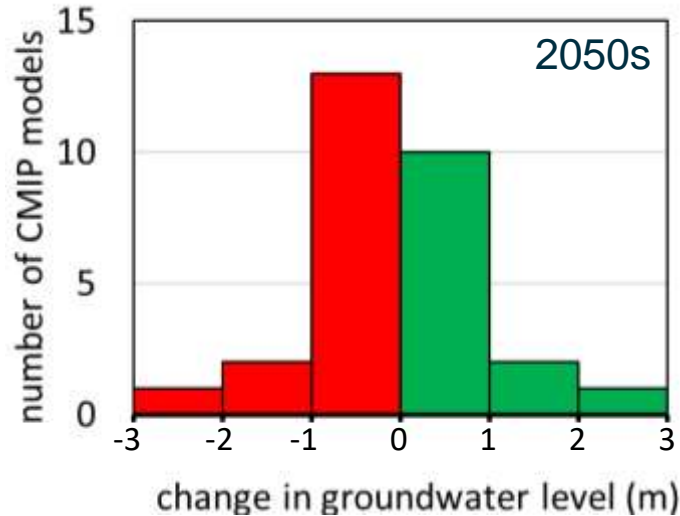
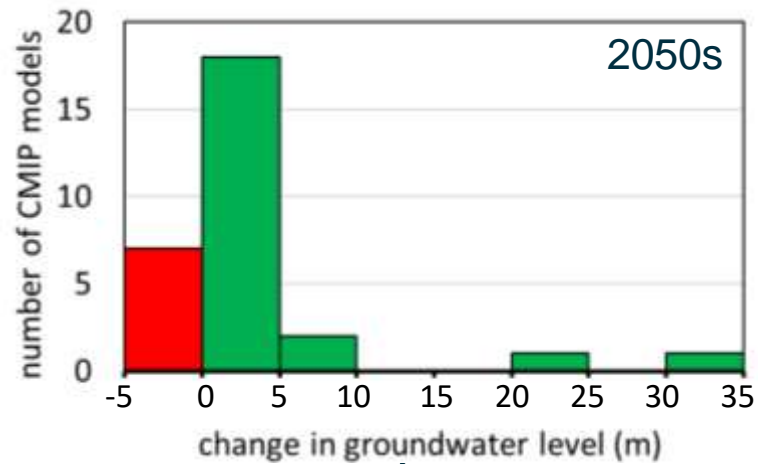
# Model calibration and gwl reconstruction

- Good calibration ( $NSE > 0.5$ )
- Differences in temporal variability between sites
  - Long term declines
  - Short term fluctuations
  - Longer term changes



# Impacts of climate change

- Used suite of 29 CMIP5 models for 2050s & 2080s
- variability across the country in gwl response
- more consistently positive in some (e.g. Arbinda); smaller range in others (e.g. Niangoloko)



# Insights & implications

- Differences in gwl responses to climate variability
- Reconstructions can contextualise gwl projections
- Multi-decadal groundwater level variability in current climate needs to be considered in water resources management
- Importance of long term monitoring





THANK YOU

Any questions?

