

# UNESCO CHAIR in Hydrogeology

**a Center of Excellence in Southern Africa**  
**Haile A Mengistu, Ph.D.**



# UNESCO CHAIR in Hydrogeology

- Situated in the University of Western Cape Campus, Cape Town
- Lead by three full time and three part-time professors
- Water analytical and environmental stable isotope laboratories
- Software Expertise: GIS, Numerical model, Geochemical model, Aquifer Test, Tracer Test, Analytical data analyses



# UNESCO CHAIR in Hydrogeology

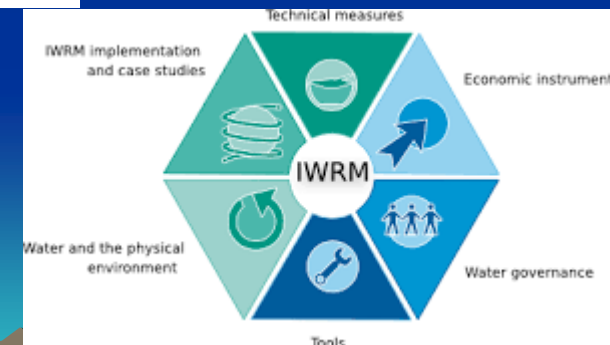
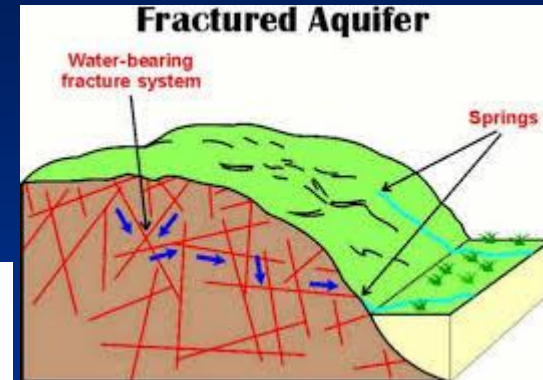
Chair's previous/ current awards and honours:

- **2010 – Present**
  - A commissioner for Africa Groundwater Commission (AGWC) to advise the Africa Ministerial Council on Water (AMCOW) on the groundwater issues
- **Since 2016**
  - Secretary General for China Africa Water Forum.
- Senior advisor to International Office of the Ministry of Water and Sanitation.



# Core Areas

- Groundwater Resource Assessment
- Pollution Assessment
- Integrated Water Resource Management
- Groundwater Governance



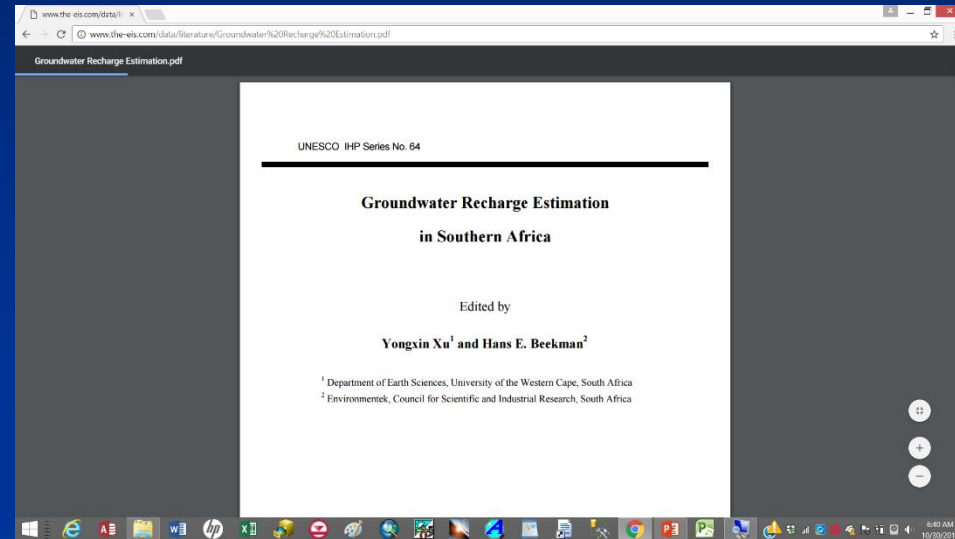
# Functions

- Propose solutions for real groundwater challenges, secure funding and conduct researches
- Communicate research outcomes through various media
- Advisory of government institutions
- Establish groundwater forums, networks, & collaborations
- Community Education



# Resource Evaluation

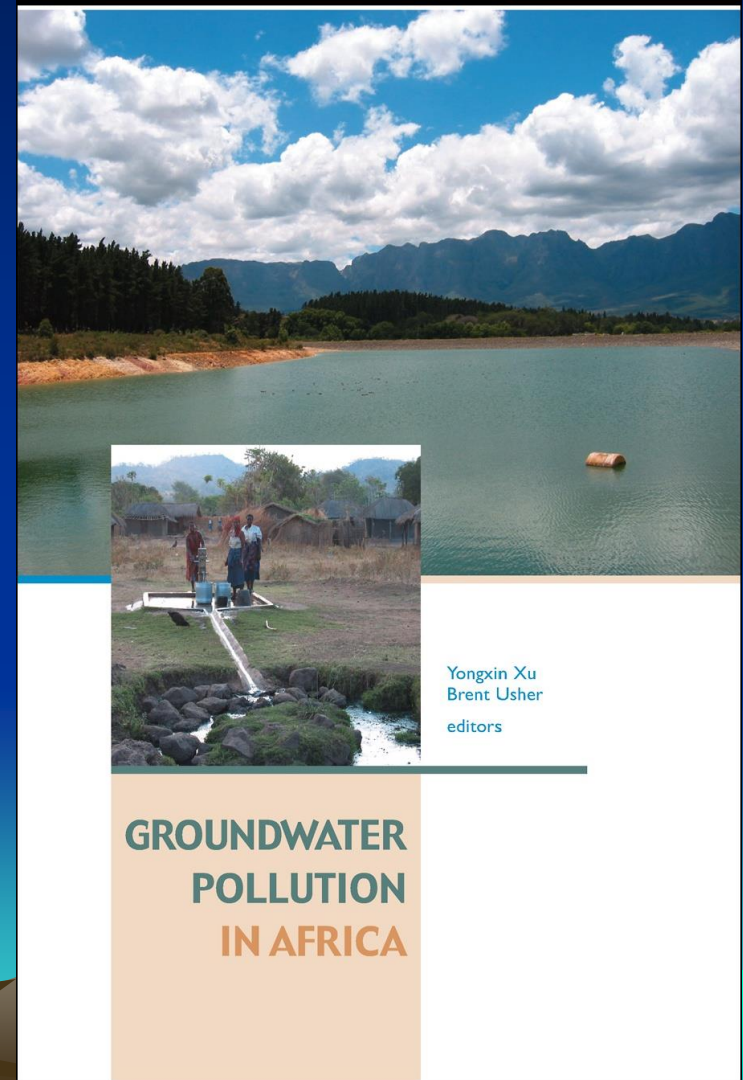
- Expertise in recharge estimation fracture aquifers – book came out of several years of experience, 2 Ph.D. students
- Improved aquifer parameter estimation in artesian system (Table mountain – 1 Ph.D).





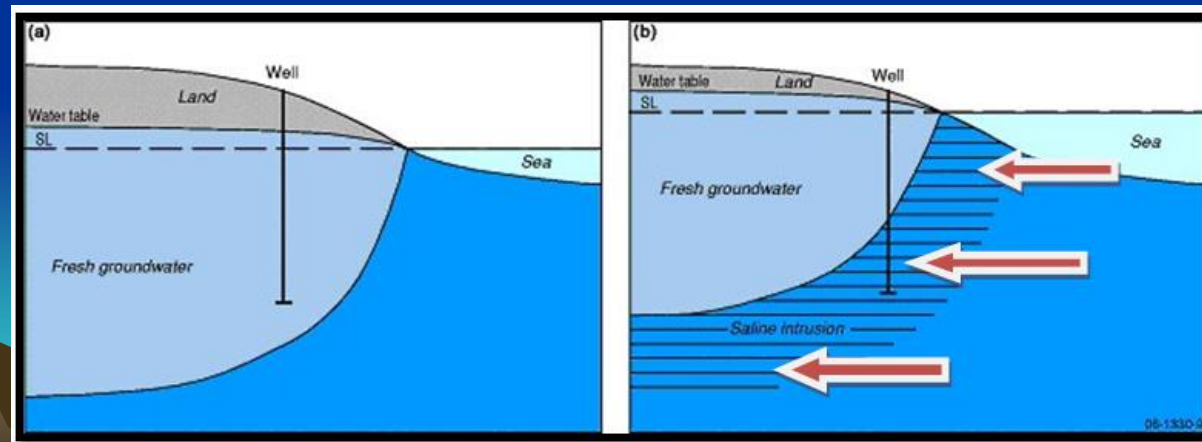
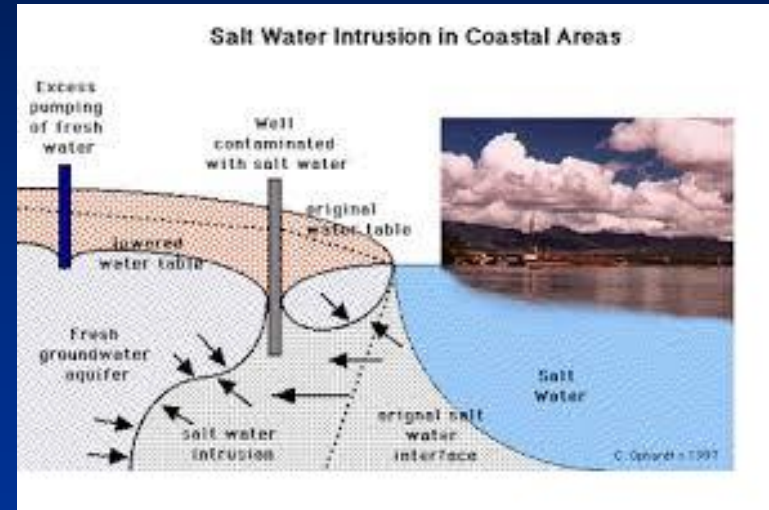
# Pollution Assessment and Control

- Urban Hydrogeology (ongoing M.Sc. Degree)
- Pollution source identification in a coastal aquifer (Cape Flat)
- Working towards improved monitoring strategy of aquifers in commercial farms (under discussion with DWA)



# Saltwater Intrusion

- Climate change induced swi in the Cape Flat Aquifer (proposed, a Ph.D. candidate) funding yet to be secured
  - Historical record
  - Remote sensing
  - Numerical modeling
  - Water chemistry finger printing





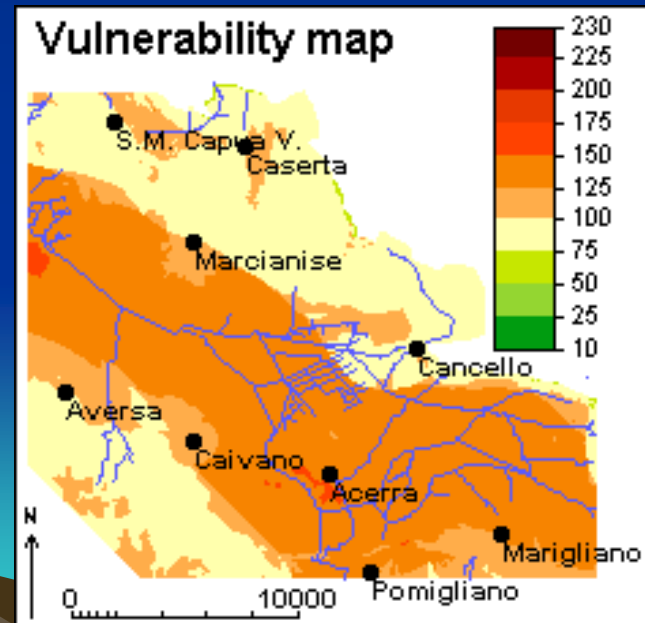
# Acid Mine Drainage

- Ongoing project in collaboration with SynXin University (China) – evaluating AMD from old coal mines into karst aquifers
- Tools developed to be applied in similar settings in SA (prospective project)
- Extensive expertise in AMD research in the Witwatersrand Basin



# Aquifer Protection

- Aquifer vulnerability map (Cape Flat Aquifer)
- Recharge area delineation
- Potential pollution source identification
- One Ph.D., two or more M.Sc. and few Honors Project – in Cape Flat aquifer



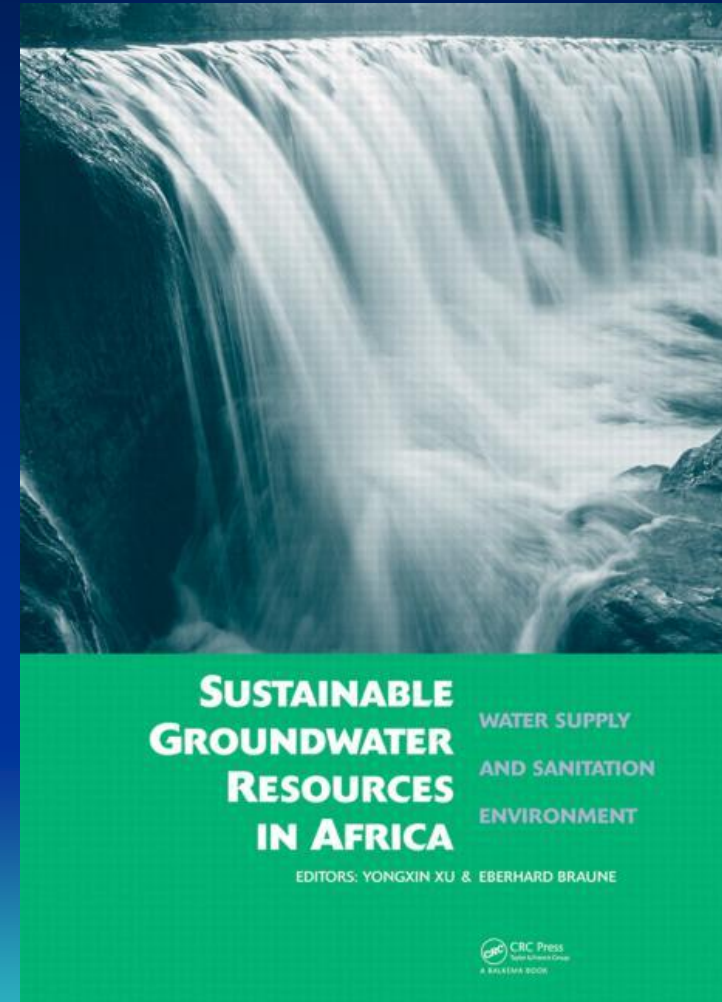
# Artificial Recharge

- Countering saltwater intrusion (Cape Flat Aquifer)
- Planning to coordinate with private consultants who already proposed for funding
- Possible up to 3 Ph.D. projects - looking into the issue in sub-catchment of the Cape Flat coastal aquifer (Pending funding) on a prefeasibility level

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# Groundwater Governance

- Projects underway to institutionalize women leadership in water management
- Integrated water Resource Management – wise to manage the resource at hand
- Advisory of the government on groundwater related directives, regulations and laws



# Networking & Collaboration

- African groundwater Network
- MOA with six local universities, few foreign universities, two Science councils
- DWA (government)
- Involved in SA chapter of IAHR
- China-Africa Forum
- Future project with Norwegian Institute of Water Studies (NIVA)
- Looking forward for new collaborations!!!!!!

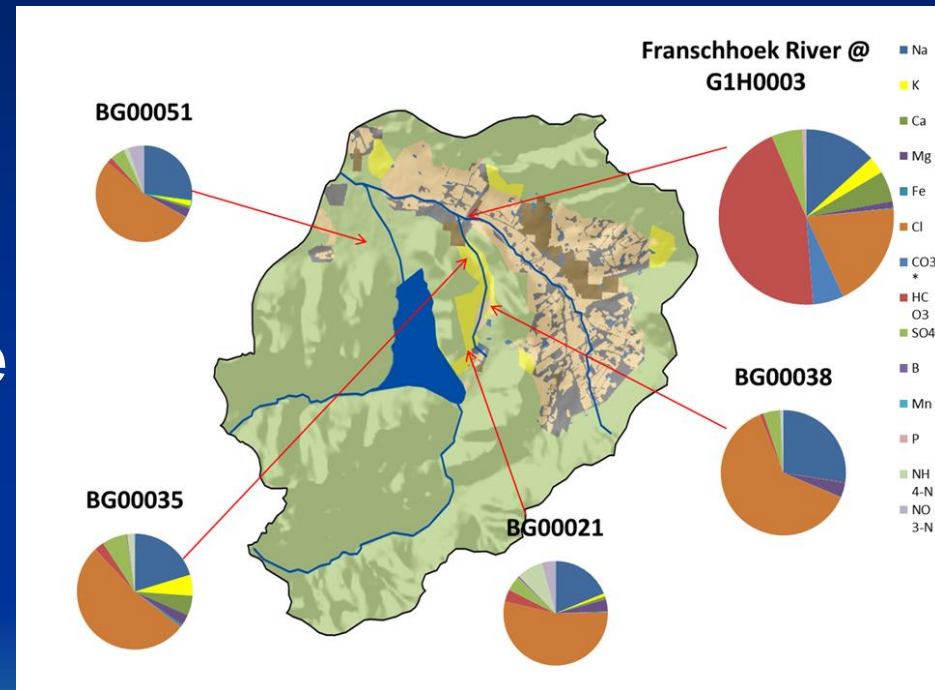


# **Regional and Continental Projects (ongoing and proposed)**

- **Proposed project – regional meteoric water line for ESI research (funding yet to be secured from IAEA, DST & WRC)**
- **Proposed project in AMD study Karst Geology (University of Tai xin, China)**

# Regional and Continental Projects (AU – NEPAD Funded)

- Study Area: Berg River Catchment – a critical wine producing area
- Extensive use of surface and groundwater
- Water use conflicts
  - Among farmers, informal settlements



# **AU – NEPAD Funded Project**

- **Water user conflicts & concerns**
  - Pollution concern from upstream settlements
  - Water allocation & drought condition
- **Objectives:**
  - Capacity development
  - Advice on sustainable water management
- **Achievements**
  - Recharge estimated using CI method
  - Gw-sw interaction assessed (statistical approach)
  - Two masters students, 2 posters, manuscript preparation for publication

# Past Achievements

- Number of Ph.D.s awarded: 15
- Up to eight books published
- Lead several policy reviews – government
- Held several short courses – IWRM, attended by professionals from SADC countries
- Completed several projects

# Future Prospects

- Realign researches towards solving real societal challenges (poverty eradication, community education etc.)
- Vision to expand the unit on catchment level water resource and protection research & development



# Future Prospect

- Strengthen services: Water chemistry and ESI laboratories
- Capacity development of groundwater professionals
- Enhance networking and collaborations locally and internationally



**Thank-  
you**