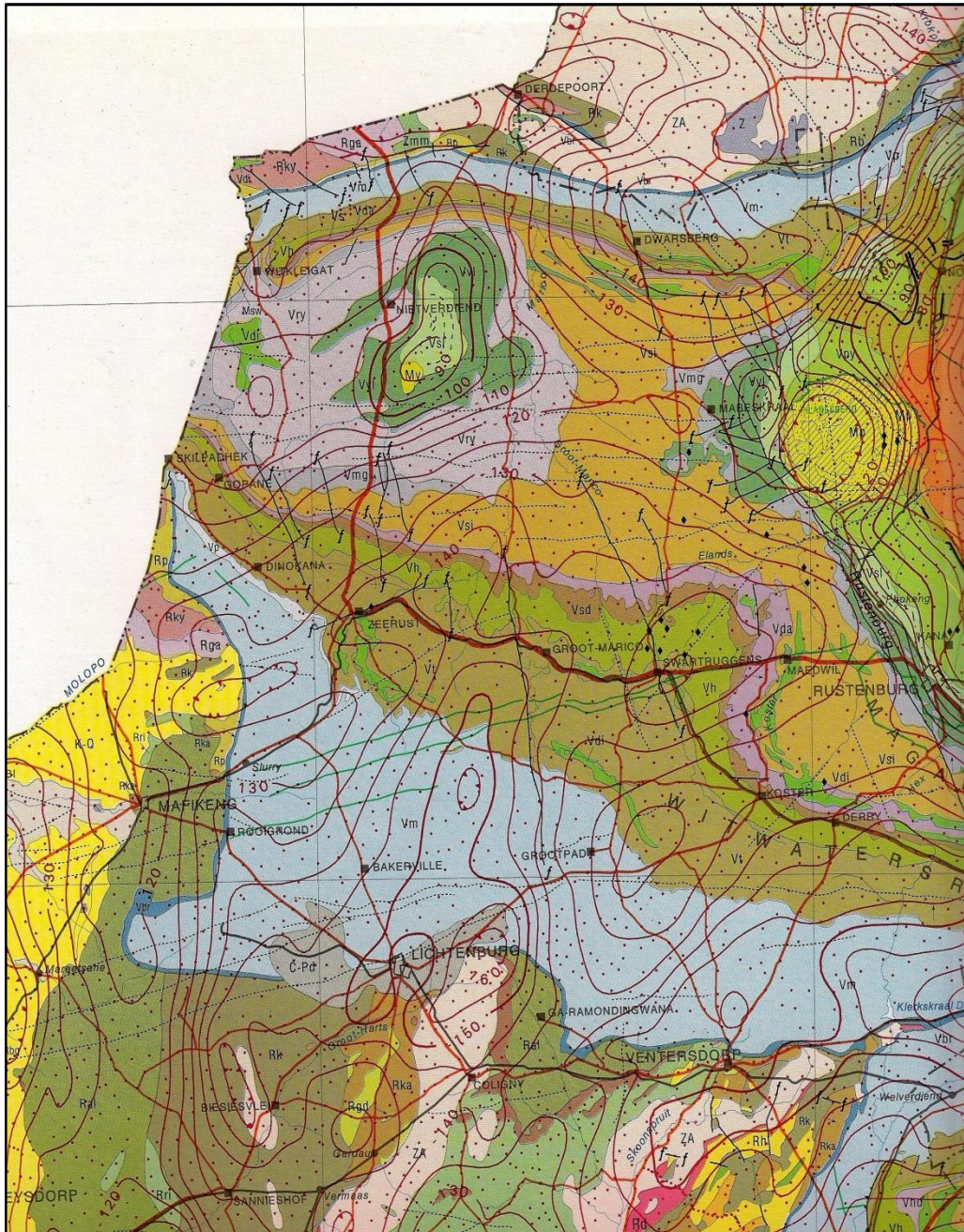


South Africa Groundwater Region 10: The Karst Belt

by

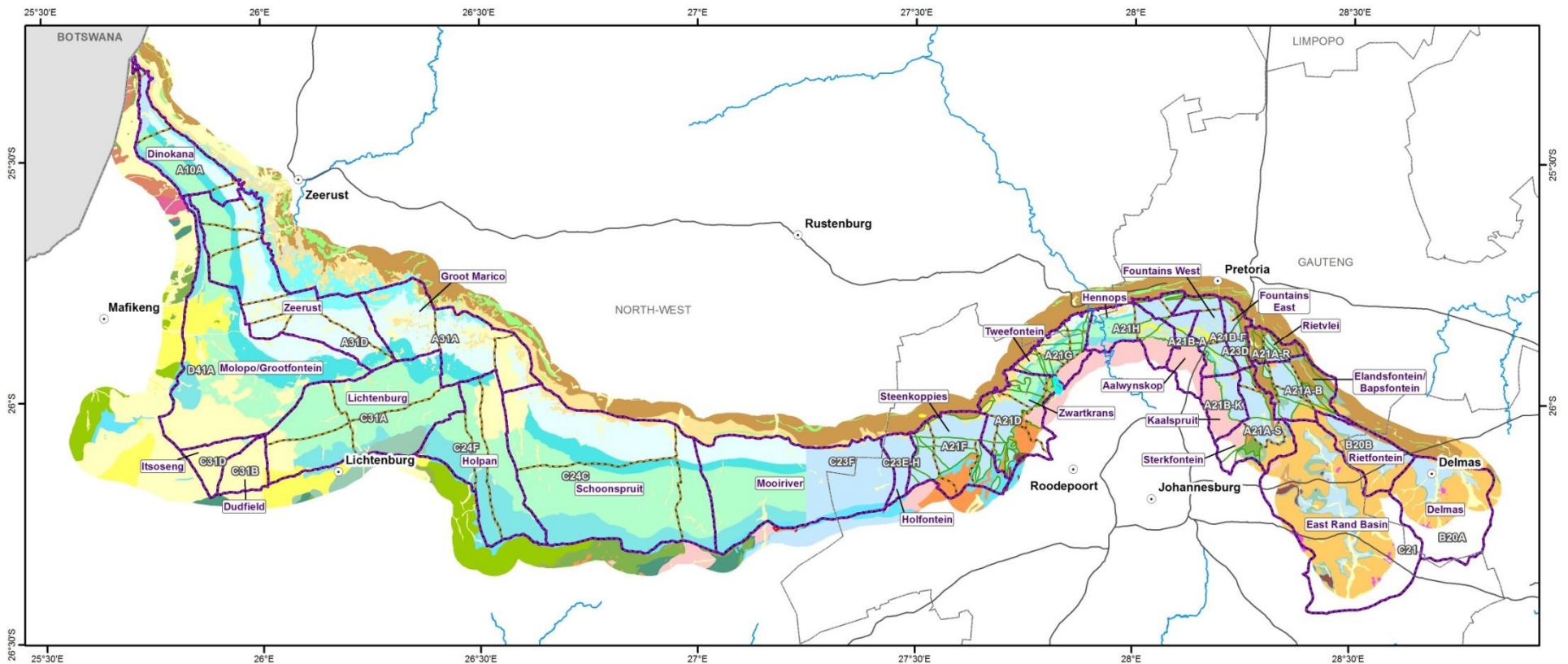
Reinie Meyer

**Transboundary Aquifer Workshop
Johannesburg - July 2015**

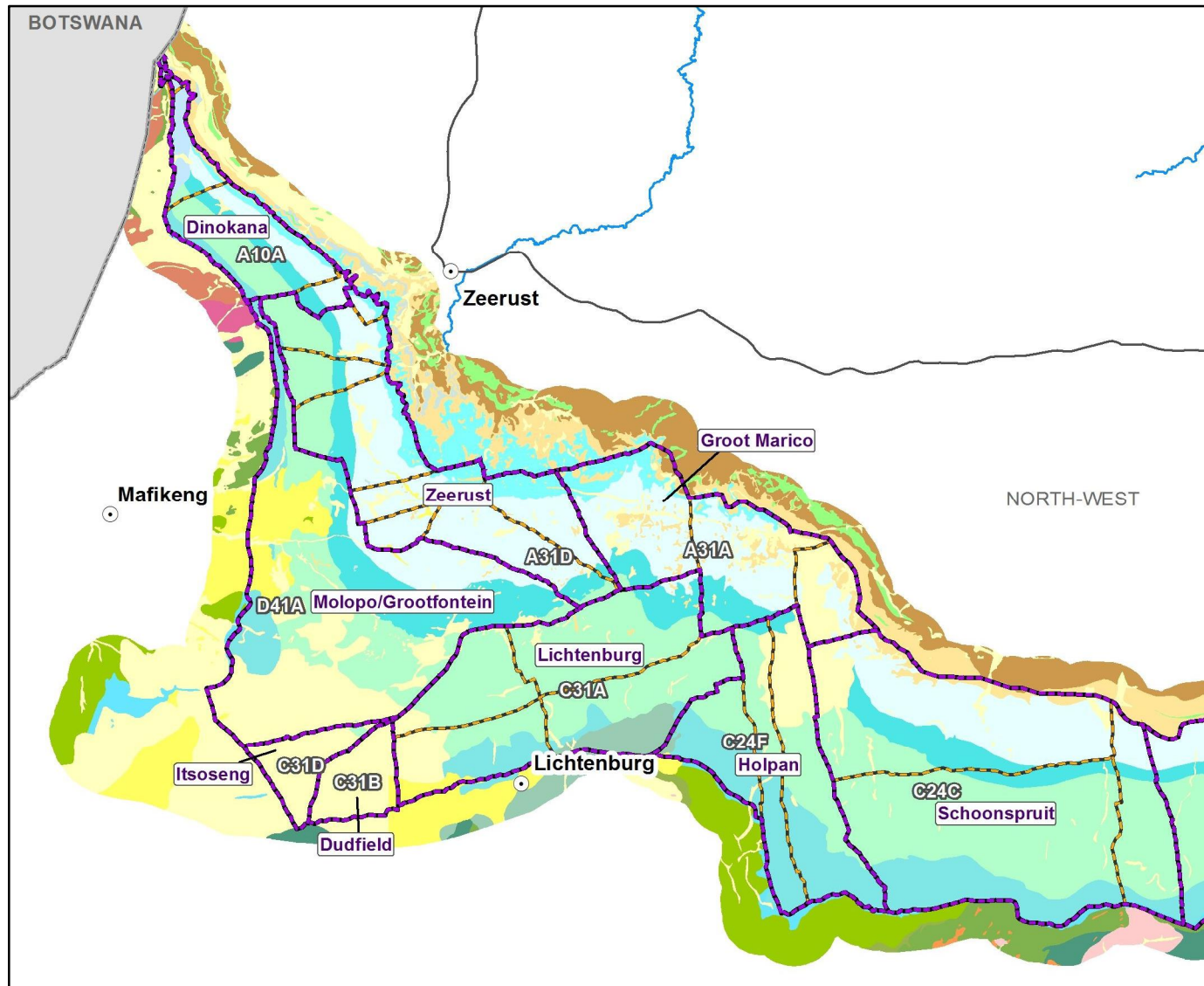


Regional Geological Setting

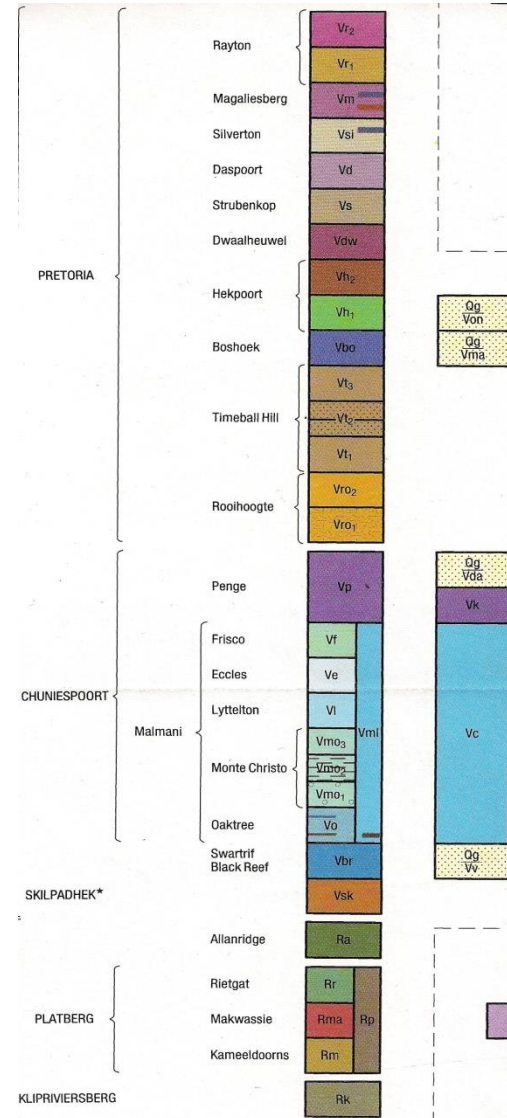
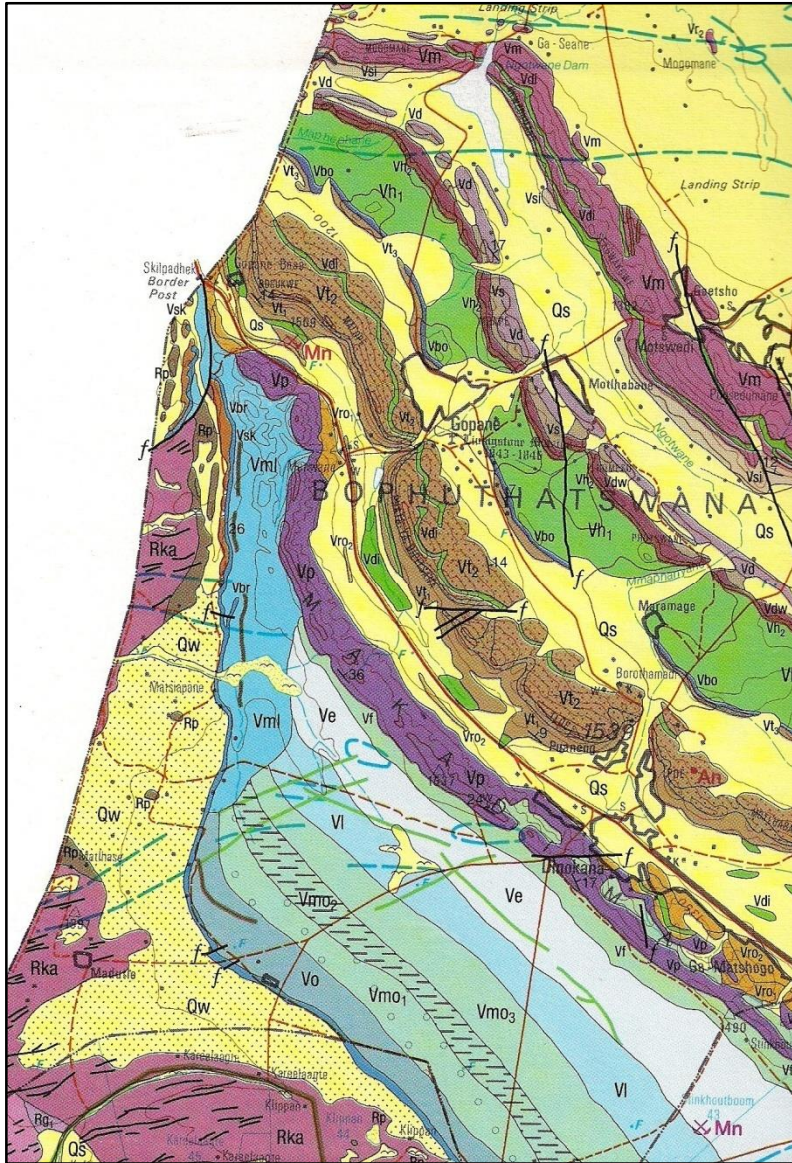
RSA Groundwater Region 10: The Karst Belt



Western part of Karst Belt



Geological detail

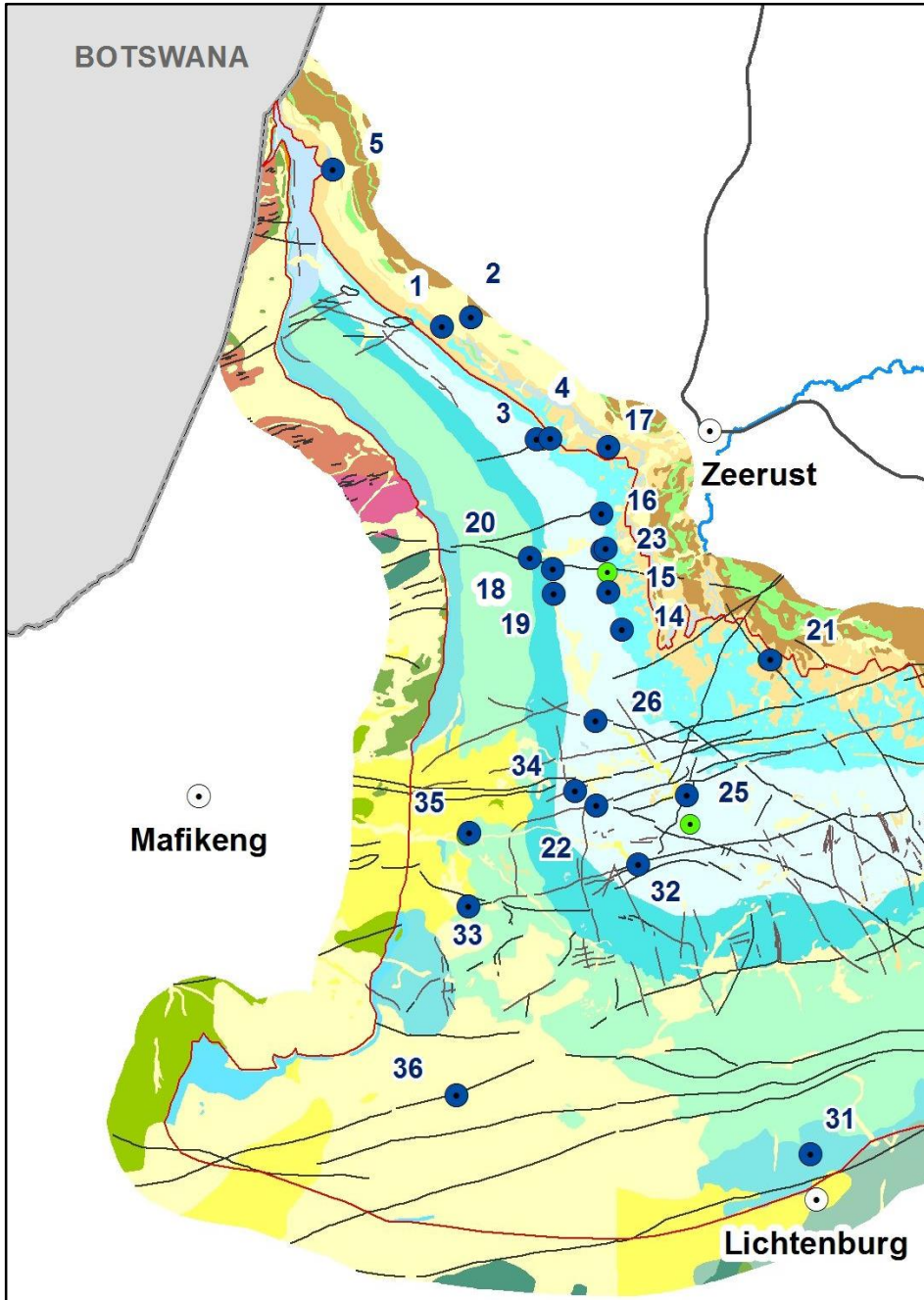


Karst and karstification

“ Karst

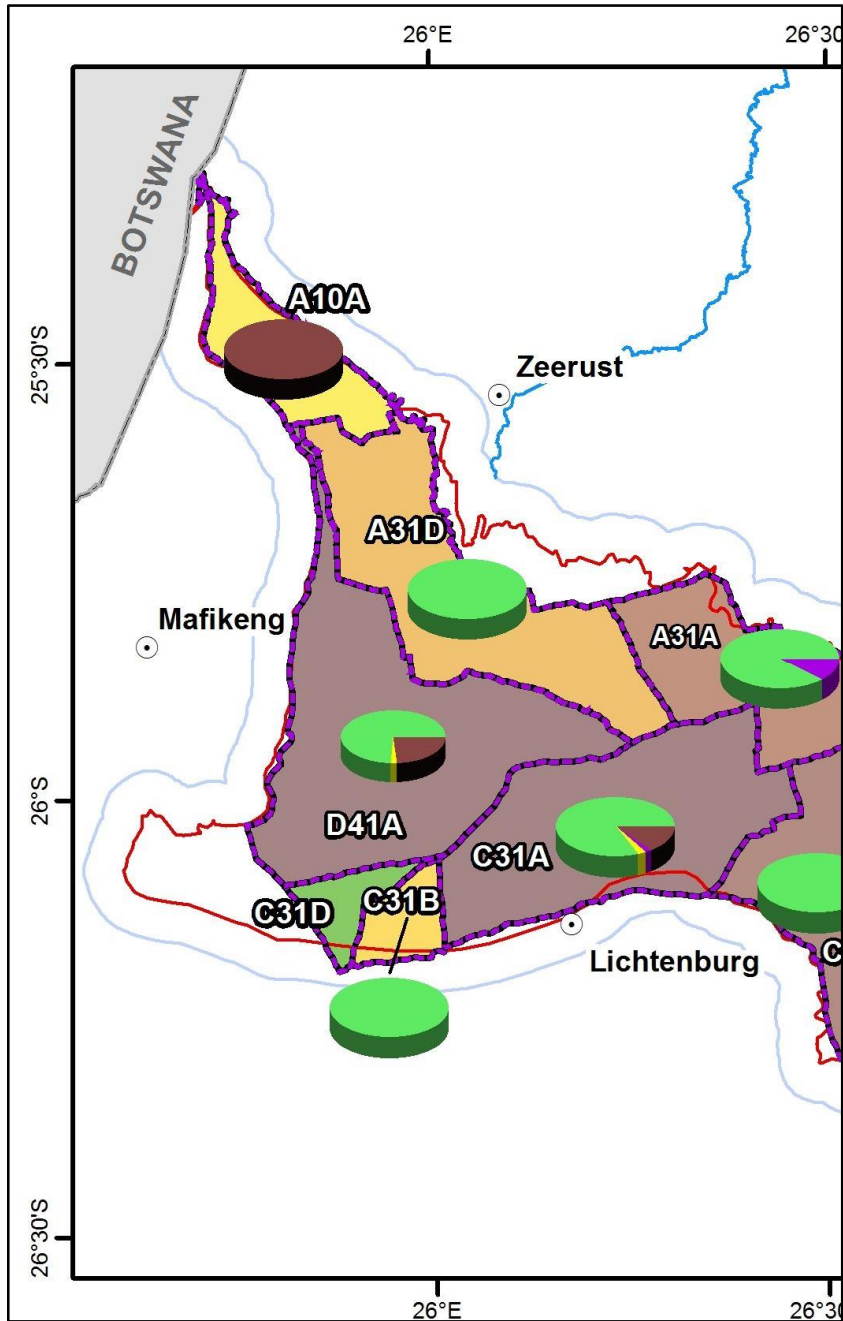
- . terrain underlain by dolomite
- . weathering and dissolution of bedrock
- . efficient underground drainage system consisting of fissures enlarged by solution, conduits and caves
- . developed over many millions of years

“ Karstification is often more prominent in the chert-rich dolomite (Eccles and Monte Christo formations)



Springs

Water use



Total Registered Water Use (WARMS, Mm³/a)



Water Uses



Aquifer characteristics

- “ General perception that dolomitic rocks are always good aquifers
- “ Requirements for high yielding dolomite aquifers:
 - “ Karstification
 - “ Leaching along joints, fractures and fissures
 - “ Steepsided bedrock depressions, 50-200m wide along deeply leached fault and fracture zones extending 20-50m below OWL
 - “ Cavities
 - “ Chert-rich dolomite and brecciated chert layers

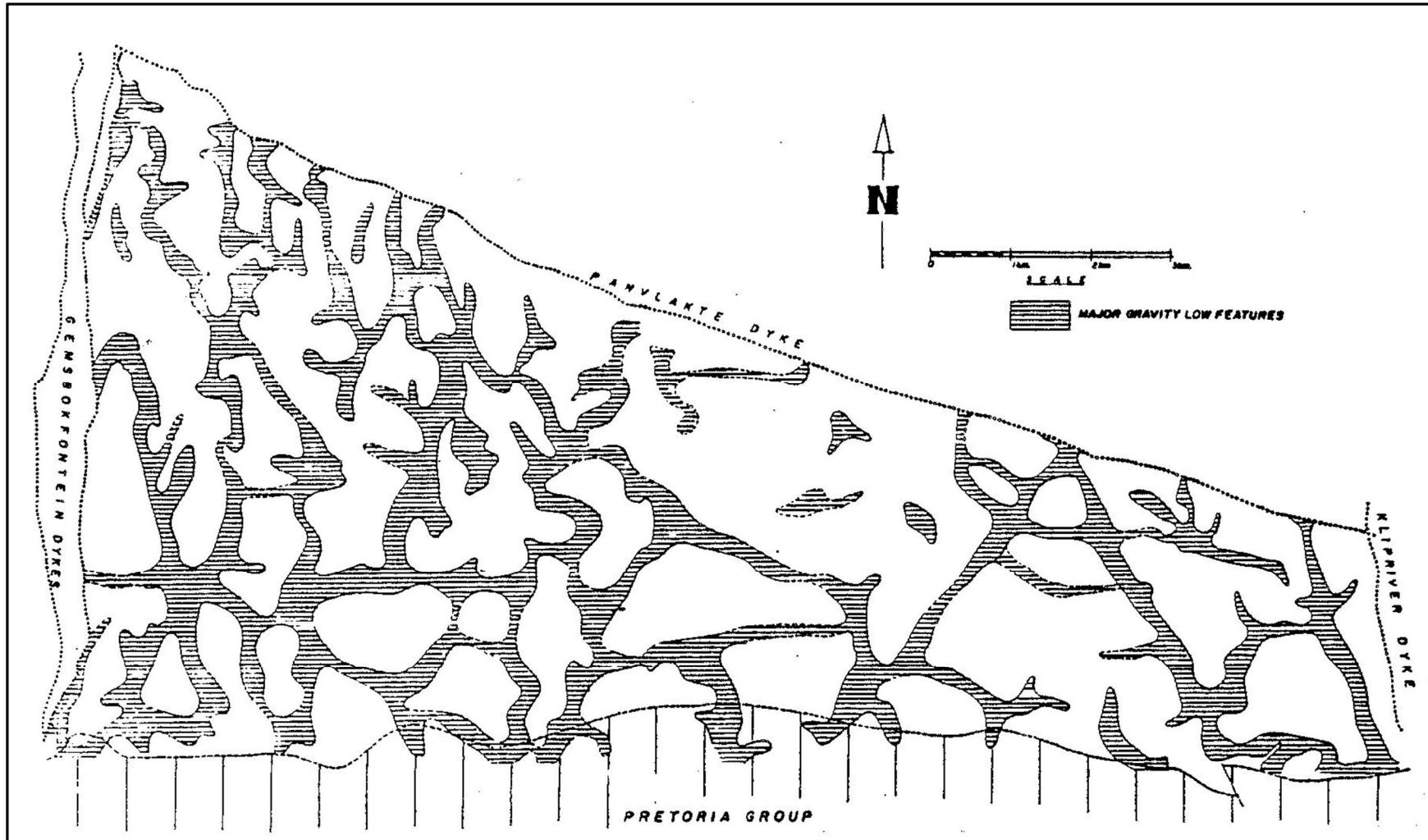
Aquifer limits

- “ What will be used as criteria to determine the aquifer boundary
 - “ Only dolomite?
 - “ Dolomite + overlying sediments?
 - “ Thickness and composition

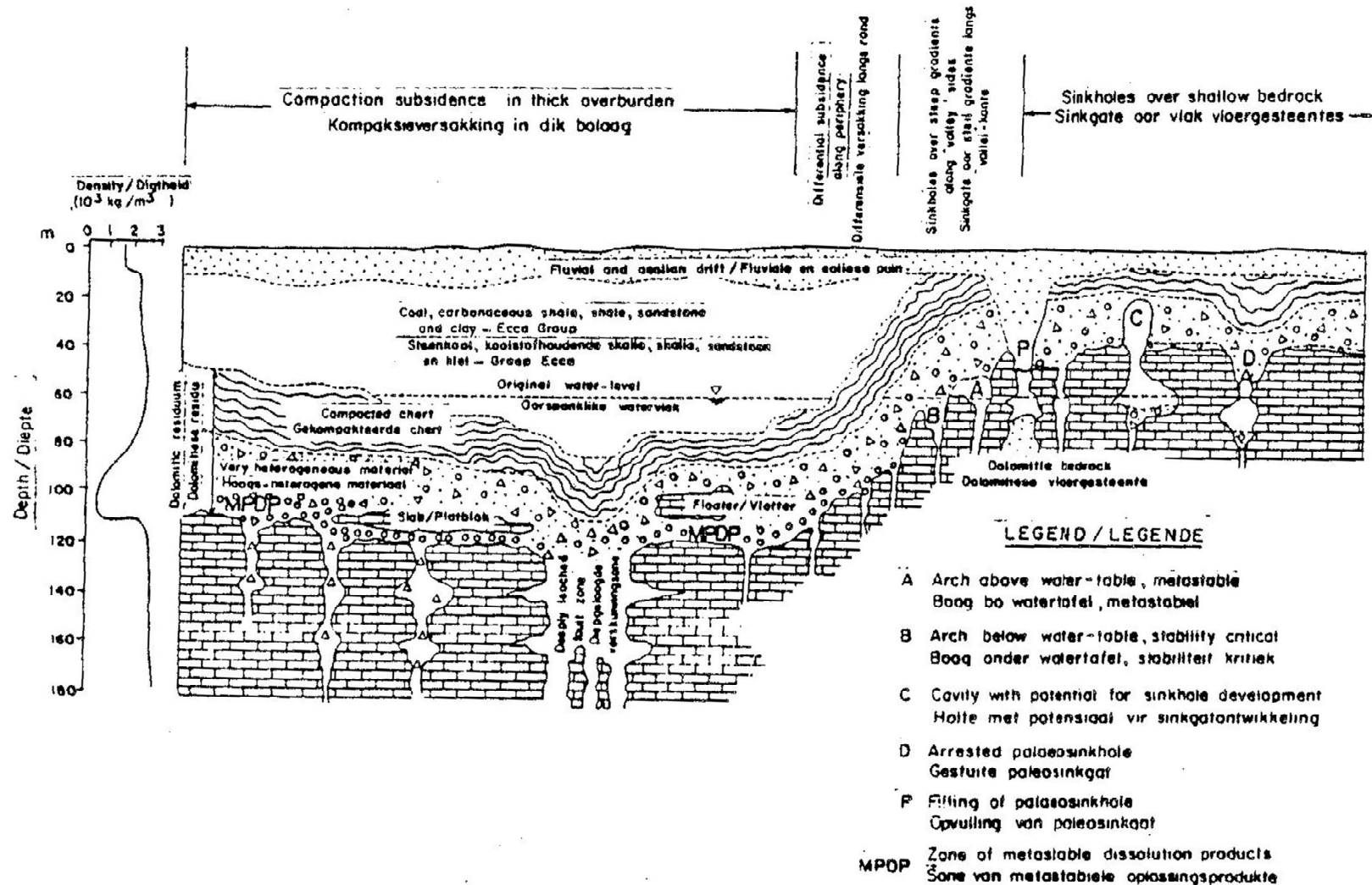
Hydrogeophysics

- “ Aeromagnetic surveys . to locate dykes and identify compartments
- “ Ground based (micro) gravity surveys
 - “ Residual gravity anomalies <1 mGal
 - “ Identification of leached
 - “ Measurements on grid pattern with <100 m station spacing
- “ Electromagnetic surveys (air and ground based)
- “ Electrical Resistivity Tomography (ERT)
- “ Seismic reflection and refraction
- “ Nuclear Magnetic Resonance (NMR or MRS)

Leached out fractures map by gravity surveys



Leaching in dolomitic terrain



Subsidence and sinkhole formation

- “ Groundwater management
- “ South African example . West Rand
- “ Water level control
- “ Surface water ingress
 - “ Storm water
 - “ Dams and Swimming pools
- “ Poor infrastructure maintenance