

SPACES II

Science Partnerships for the
Adaptation to Complex Earth System
Processes in Southern Africa



EGU General Assembly 2020

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A German – South African SPACES collaboration
to advance land degradation assessments



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SALDi Objectives

- **monitor and model land surface dynamics / land degradation** in multi-use landscapes across the climate gradient of South Africa
- **advance tools** for soil degradation **assessment**, i.e. soil erosion by water
- take advantages of **high spatial-temporal Earth Observation data** and **in situ** information as well as **modeling** approaches
- understand **socio-economic implications** of land degradation on farmers level
- contribute to **scientific exchange and capacity building**

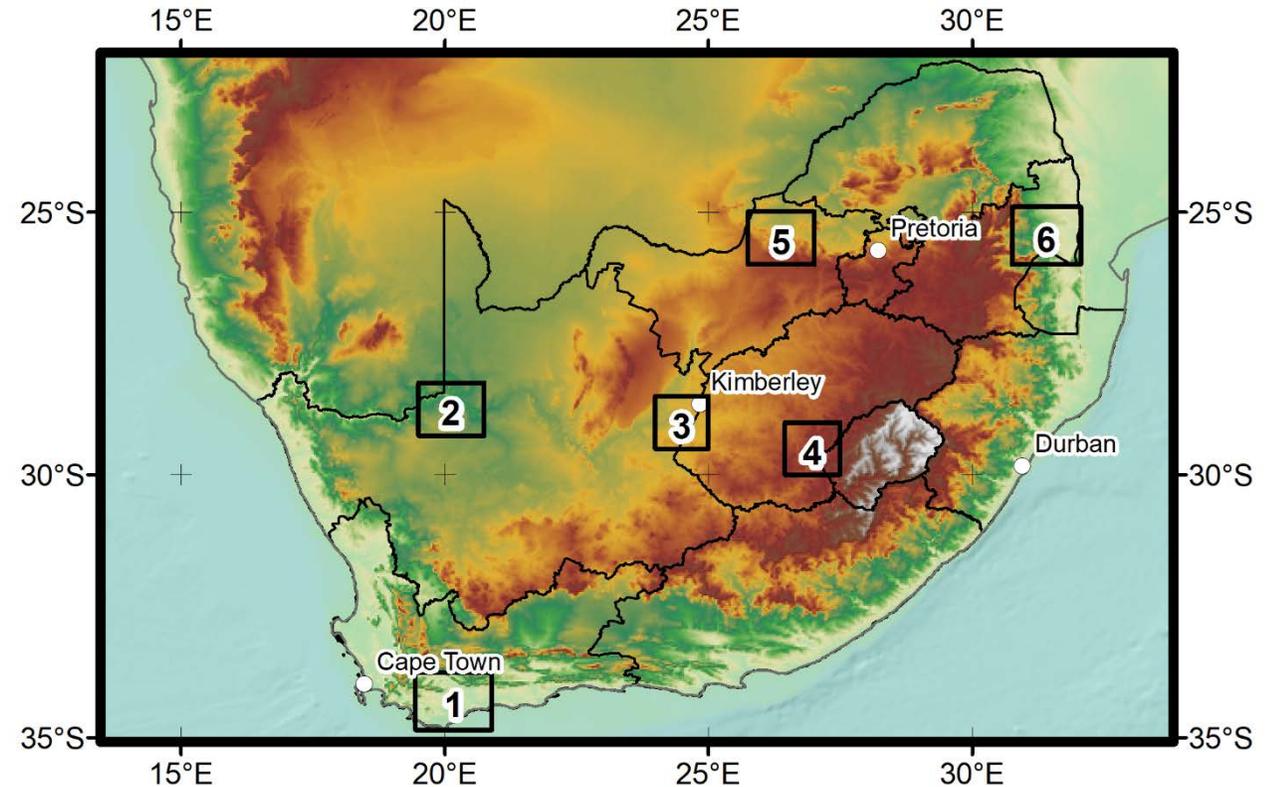


Figure 1: SALDi study sites (size : 100 x 100 km) across the climate gradient in South Africa.

SALDi Objectives and workflow I

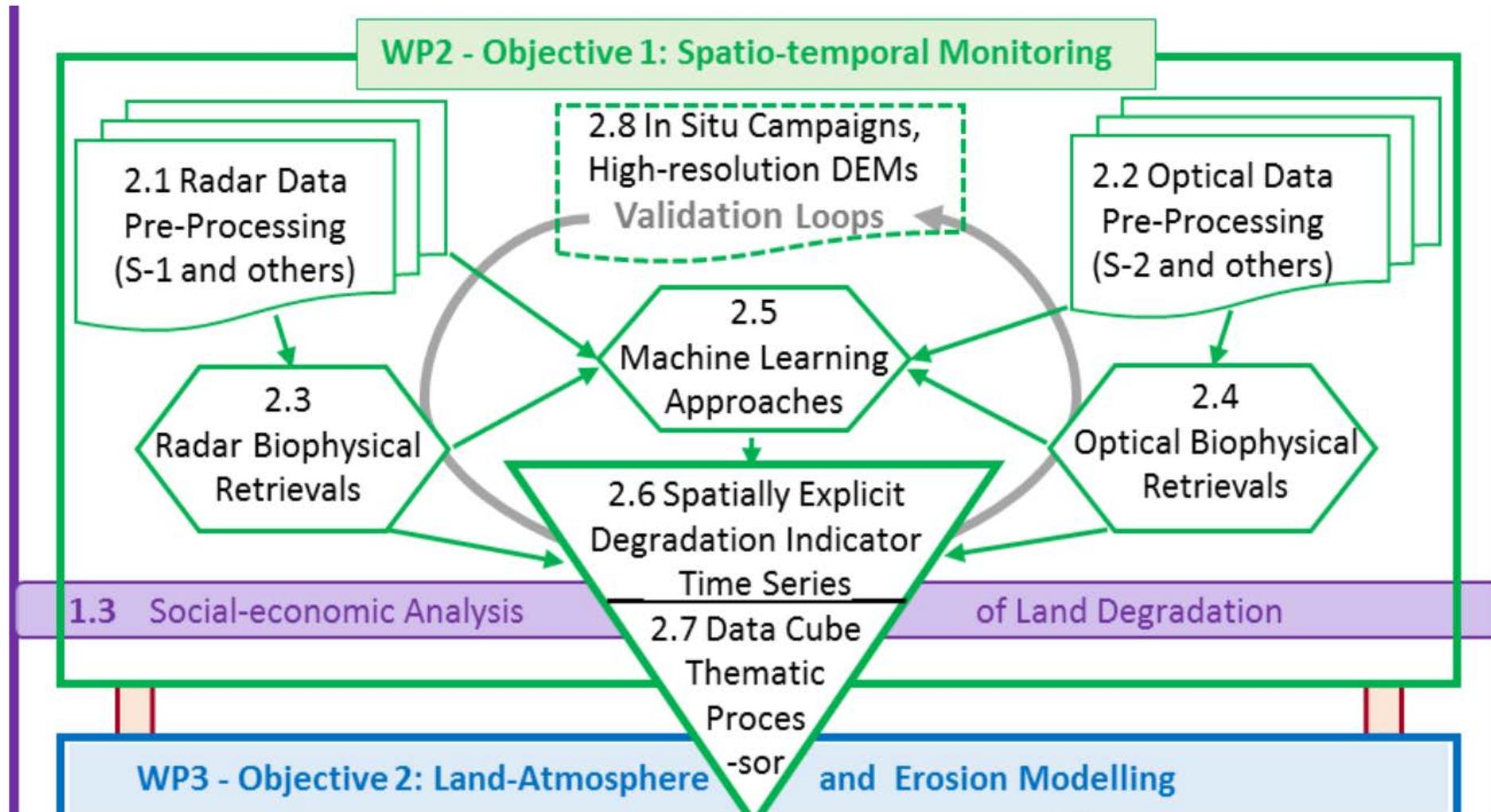


Figure 2a: SALDi WP1 Spatio-temporal Monitoring activities

SALDi Objectives and workflow II

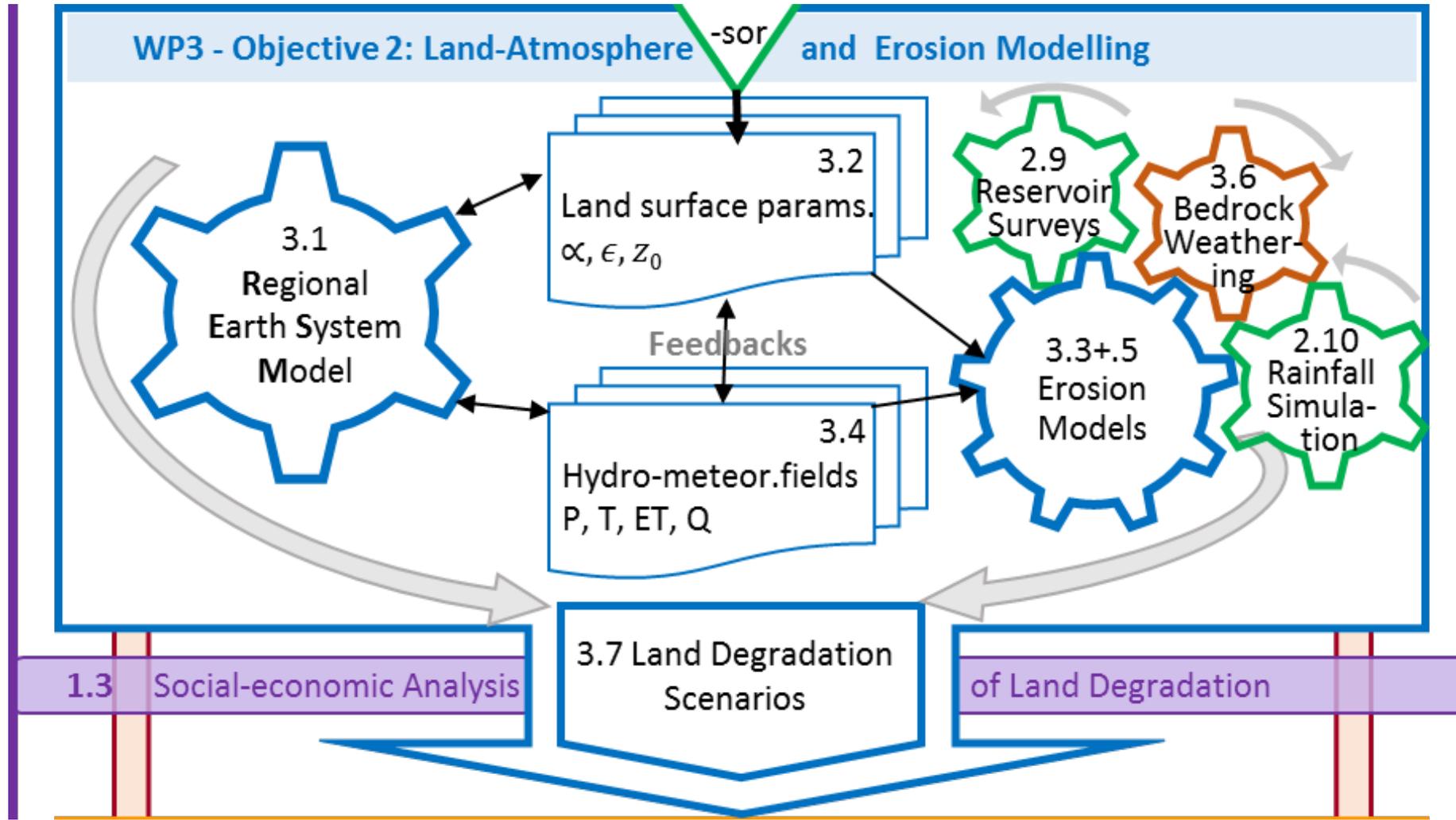


Figure 2b: SALDi WP2 Land-Atmosphere and Erosion Modelling activities

SALDi Objectives and workflow III

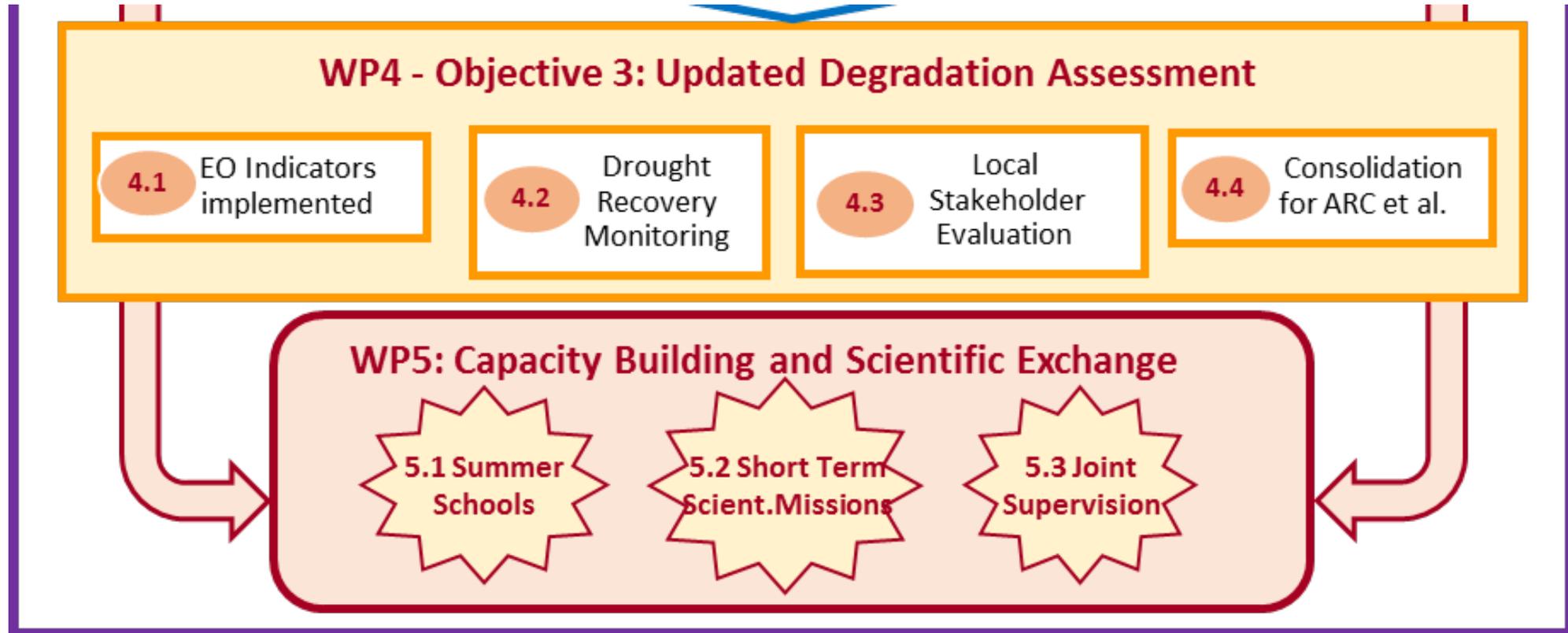


Figure 2c: SALDi WP4 Updated Degradation Assessment and WP5 Capacity Building and Scientific Exchange activities

SALDi 1st years activities and achievements



Figure 3: Installation of soil moisture network at Lower Sabie, southern Kruger Nationalpark (KNP)

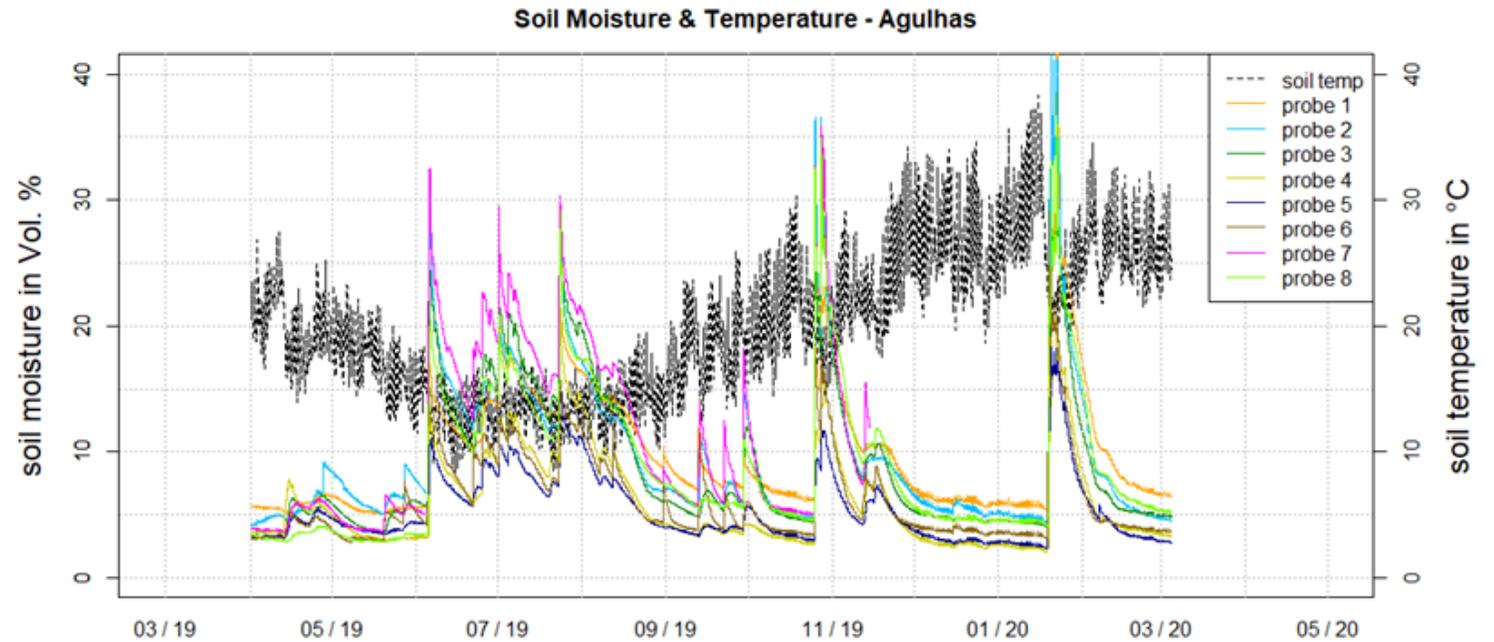


Figure 4: 1st years soil moisture and soil temperature record for the Agulhas site in the Nuwejaars Wetland SMA close to Elim

SALDi 1st years activities and achievements



Figure 5: Rainfall simulation experiment in the Eastern Free State close to Ladybrand

For more details see:

SSS2.5, D2164, EGU2020-18155

<https://meetingorganizer.copernicus.org/EGU2020/EGU2020-18155.html>

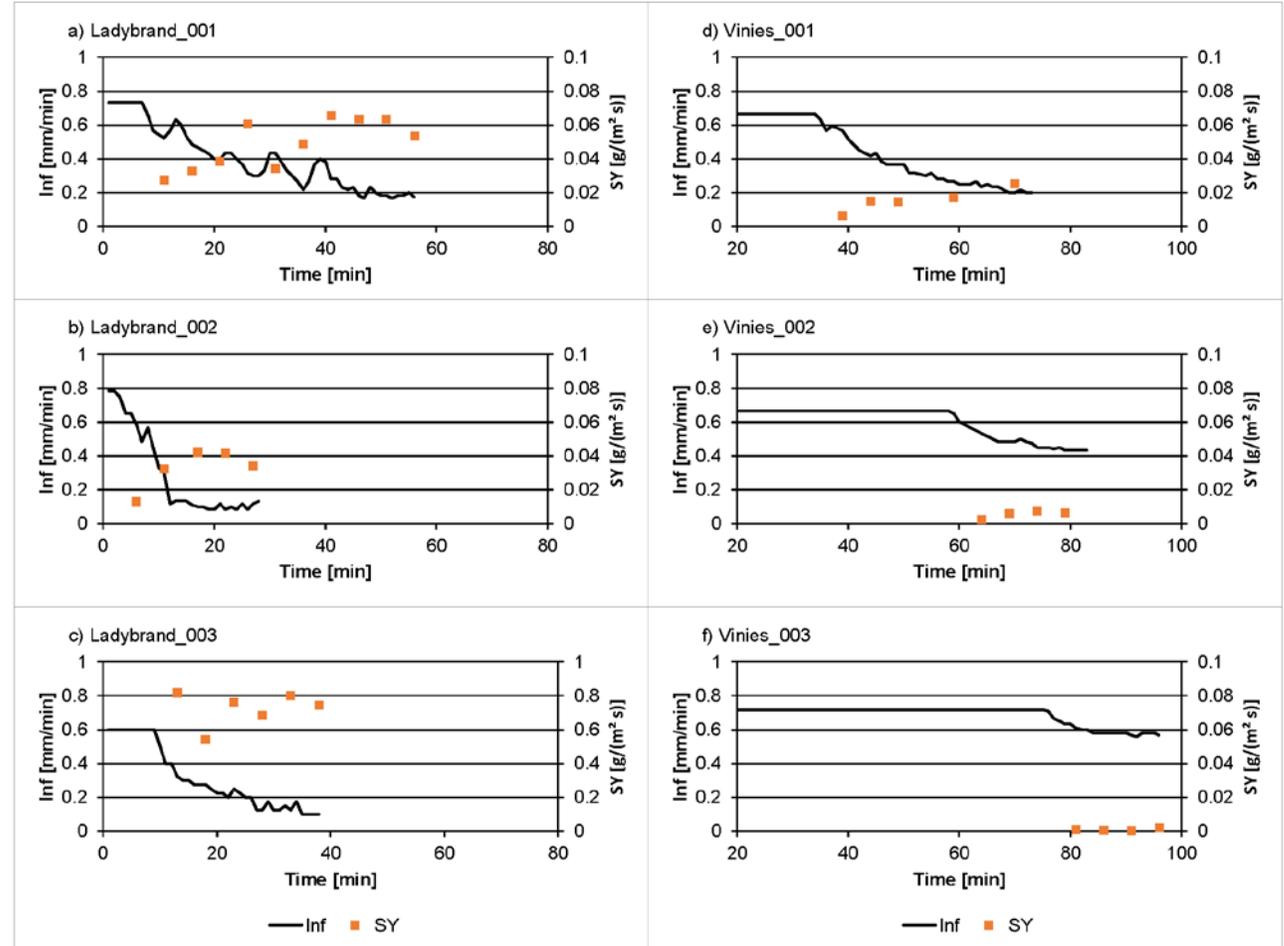


Figure 6: Infiltration [mm/min] and soil loss (g/(m² s)) for rainfall simulation experiments (40 mm/h) on six different plots (3 m²)

SALDi 1st years activities and achievements

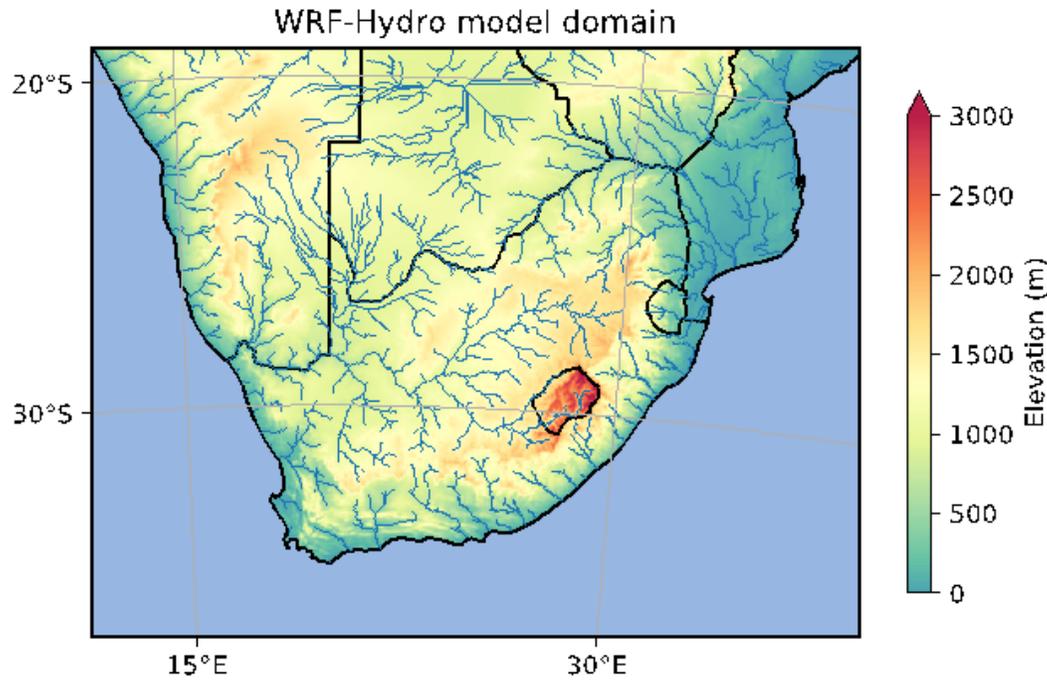


Figure 7: Domain for the Hydro-WRF modelling of land-atmosphere interactions

For more details see:

HS2.2.2, D110, EGU2020-17772

https://presentations.copernicus.org/EGU2020/EGU2020-17772_presentation.pdf

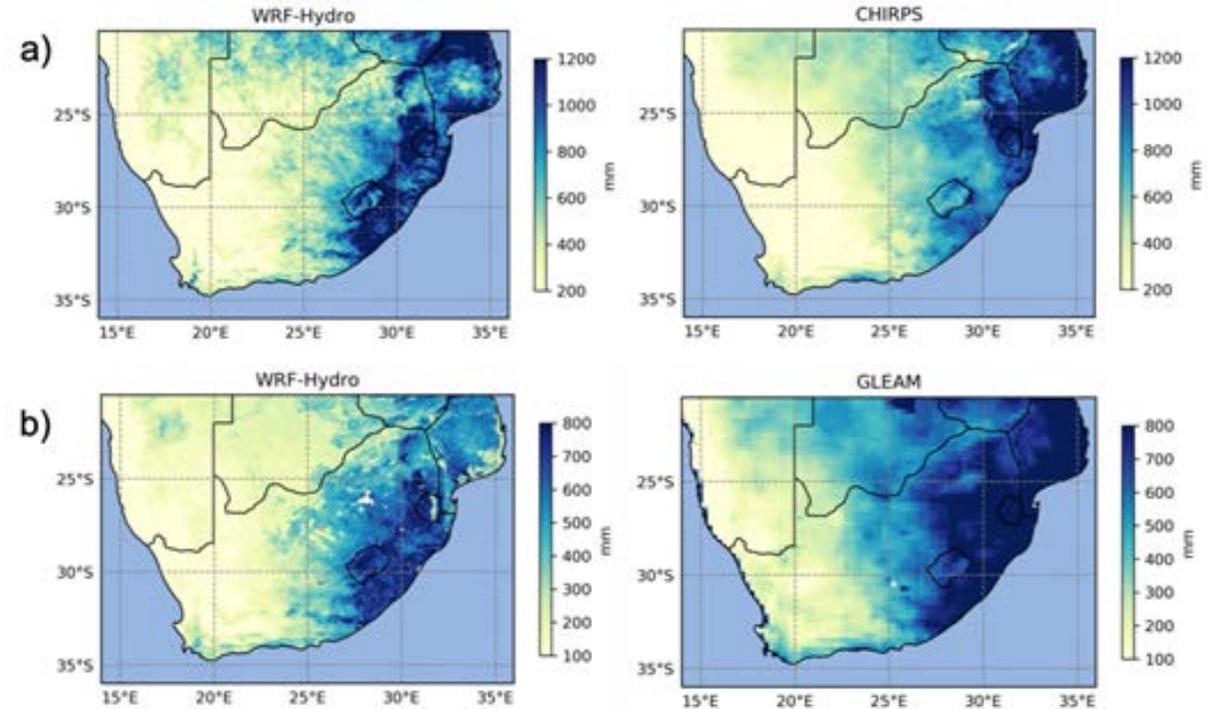


Figure 8: First results of the model adjustment to the model domain (left) and comparison with existing data (right) for June 2000

a) accumulated precipitation

b) accumulated evapotranspiration

SALDi 1st years activities and achievements

The SALDi remote sensing activities include the analysis of Sentinel-1 (S1) radar and Sentinel-2 (S2) optical data and in-situ assessment of observations in multi-use landscapes across the climate gradient of South Africa, i.e. the six SALDi study sites

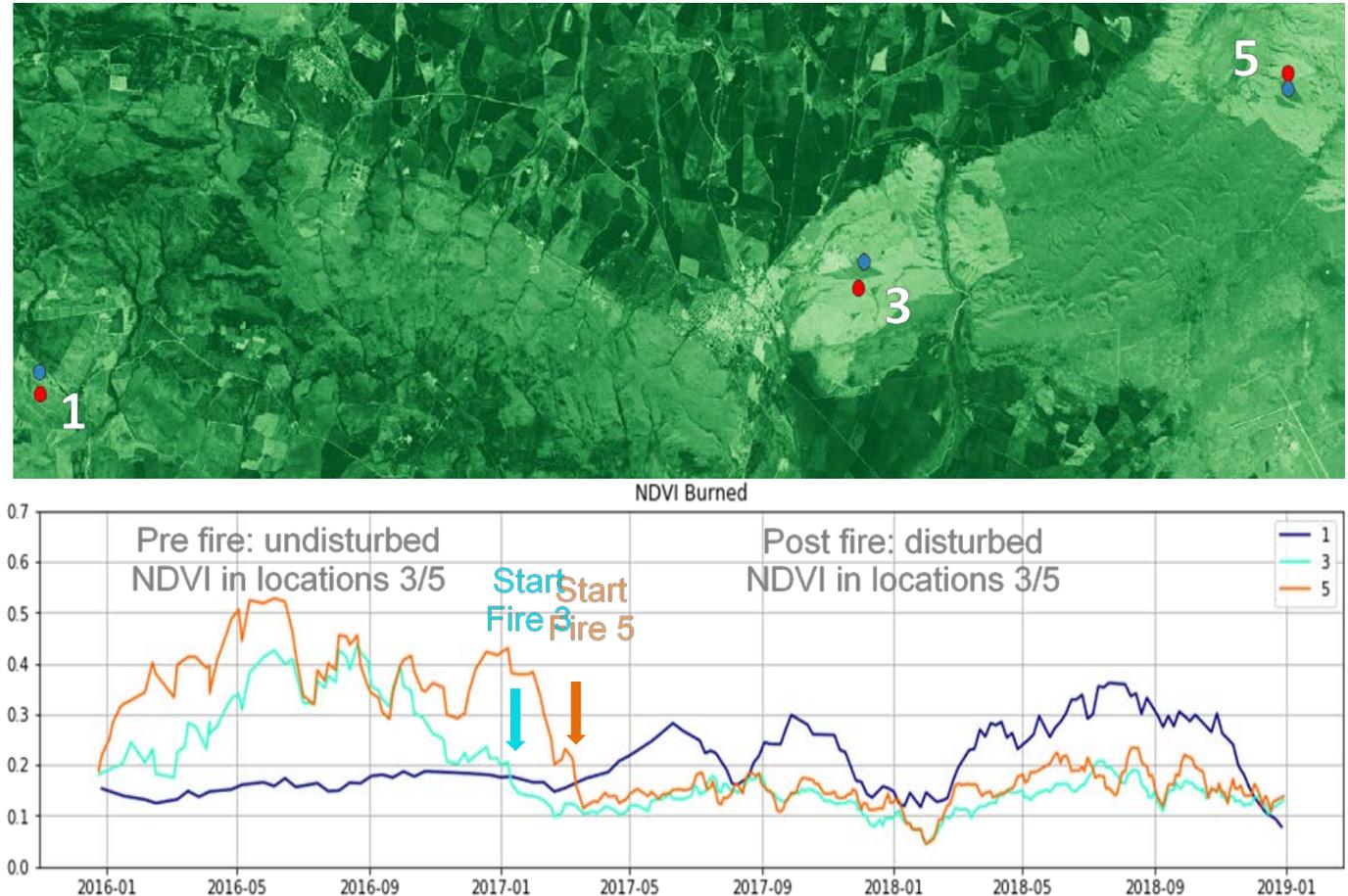


Figure 9: Effects of fires in the Agulhas Region measured by NDVI. Fire 1 (blue) started before the S2 mission launch and shows a steady recovery, while areas affected by fires 3 and 5 show only a slight recovery after two years.

SALDi 1st years activities and achievements



Figure 11: The team of SALDi discussing land degradation issues with experts at ARC-ISCW in Pretoria



Figure 12: Discussing land degradation issues with local Land Care experts in the field (Eastern Free State)

Thank you for your attention and interest