



Sensitivity and resolution of ERT for soil moisture monitoring in contour hedgerow intercropping systems

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Soil moisture monitoring in intercropping systems...

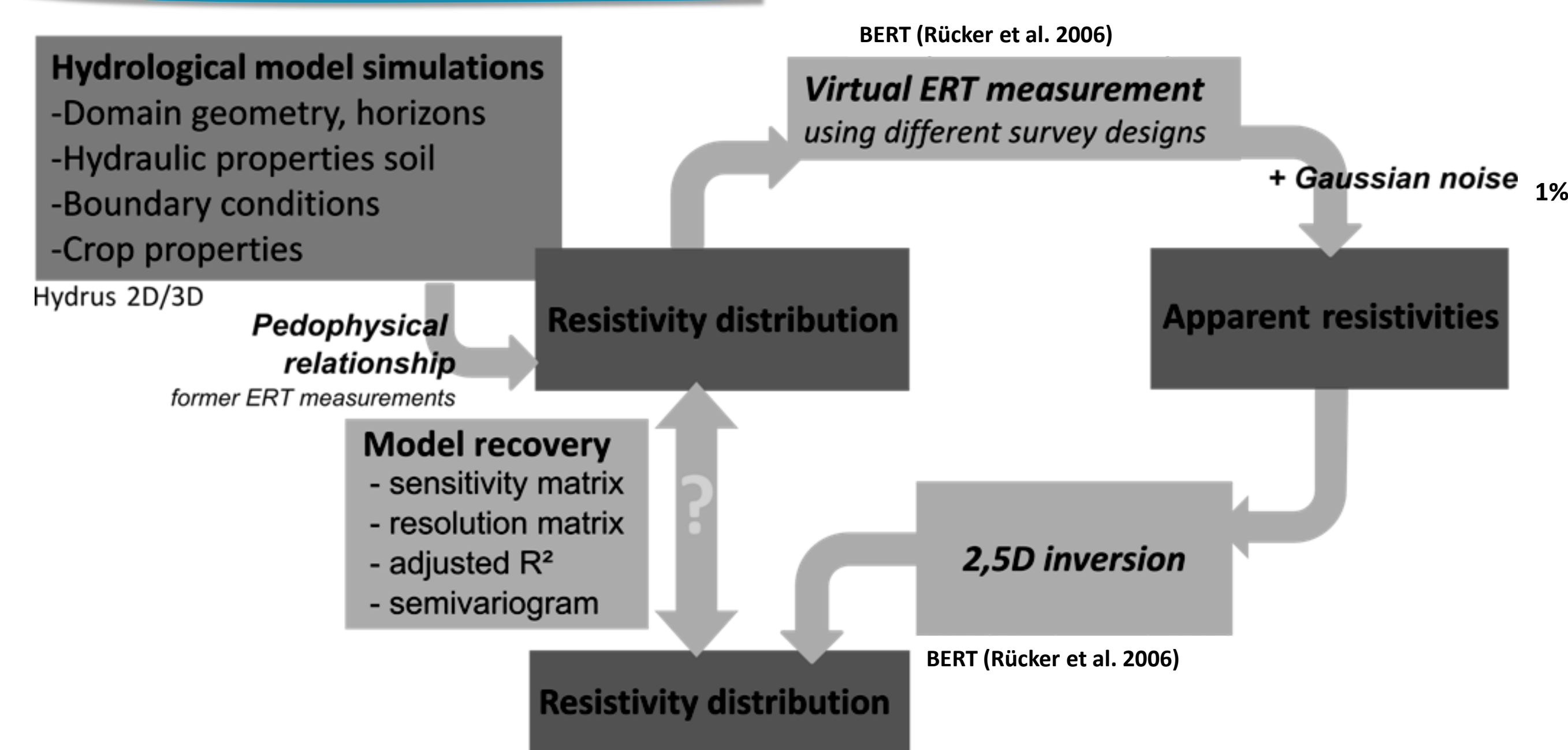
Agriculture on infertile, shallow or steep soils in the humid tropics often leads to a **low efficiency** due to a combination of high leaching rates in the growing season and shallow root development of annual food crops. **Mixed cropping systems** have been proposed as an alternative to traditional agricultural practice with a single crop. However, sometimes a negative impact on crop response has been observed due to **competition**.

...with ERT?

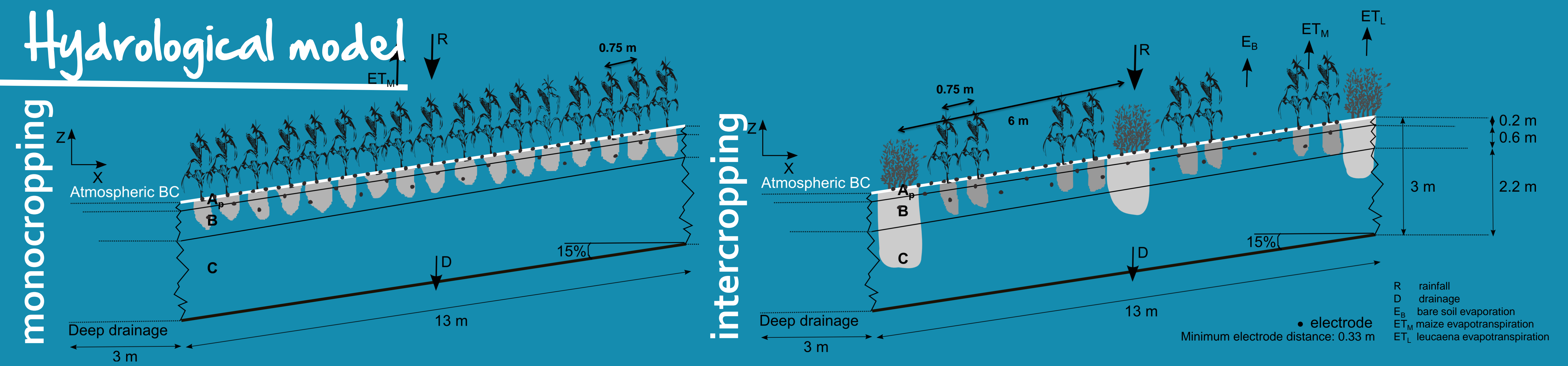
To get a more detailed understanding of the competition for water, 2- or 3-D monitoring of the water fluxes in the soil-plant-atmosphere system is necessary. Previous studies stress the promising capabilities of Electrical Resistivity Tomography (ERT), but the difficulties to interpret the measured electrical resistivity remain, certainly under **field conditions**.

Objectives

General approach



Hydrological model



Results

1-D profiles

Spatial variability

Semivariogram

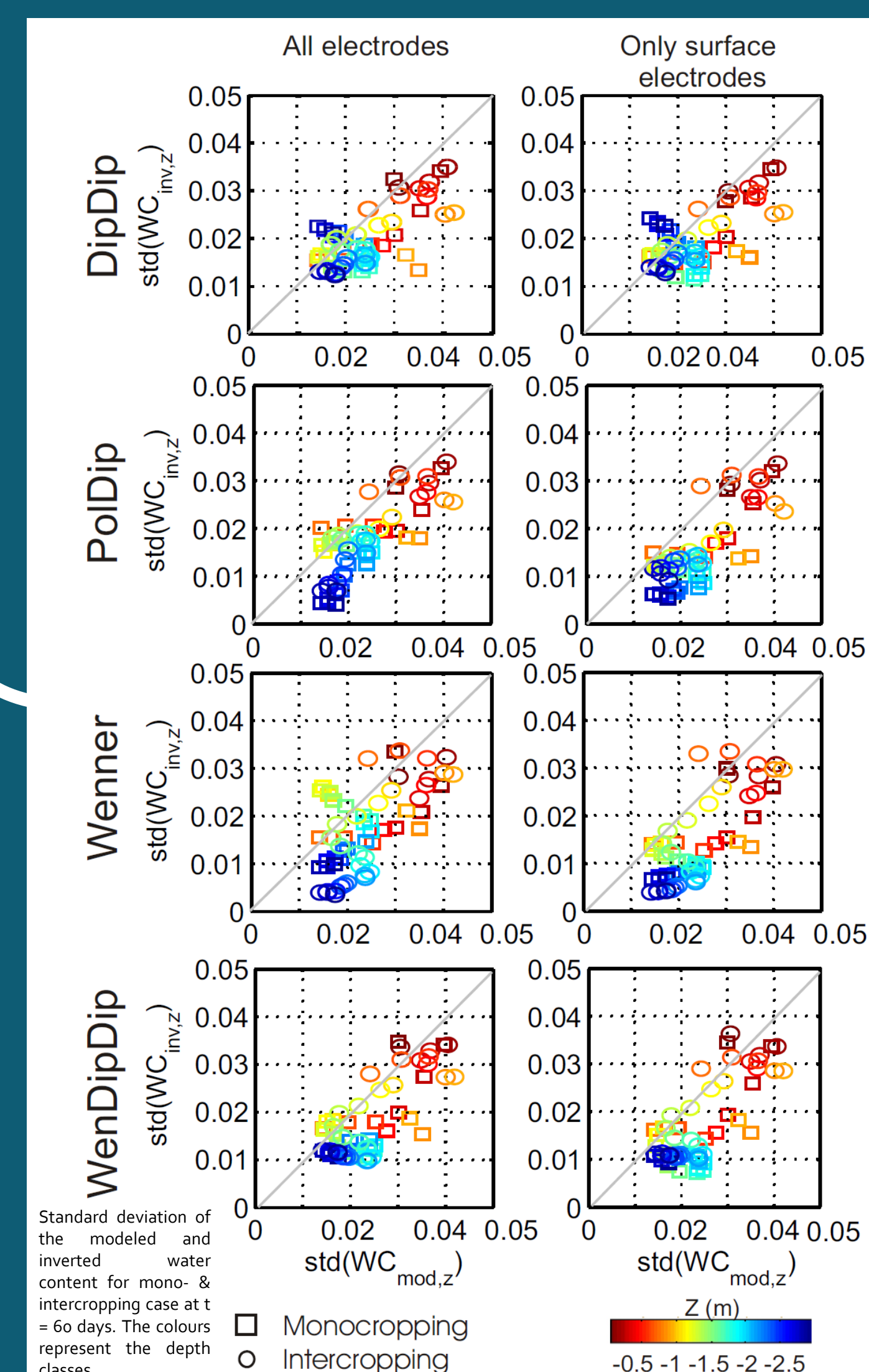
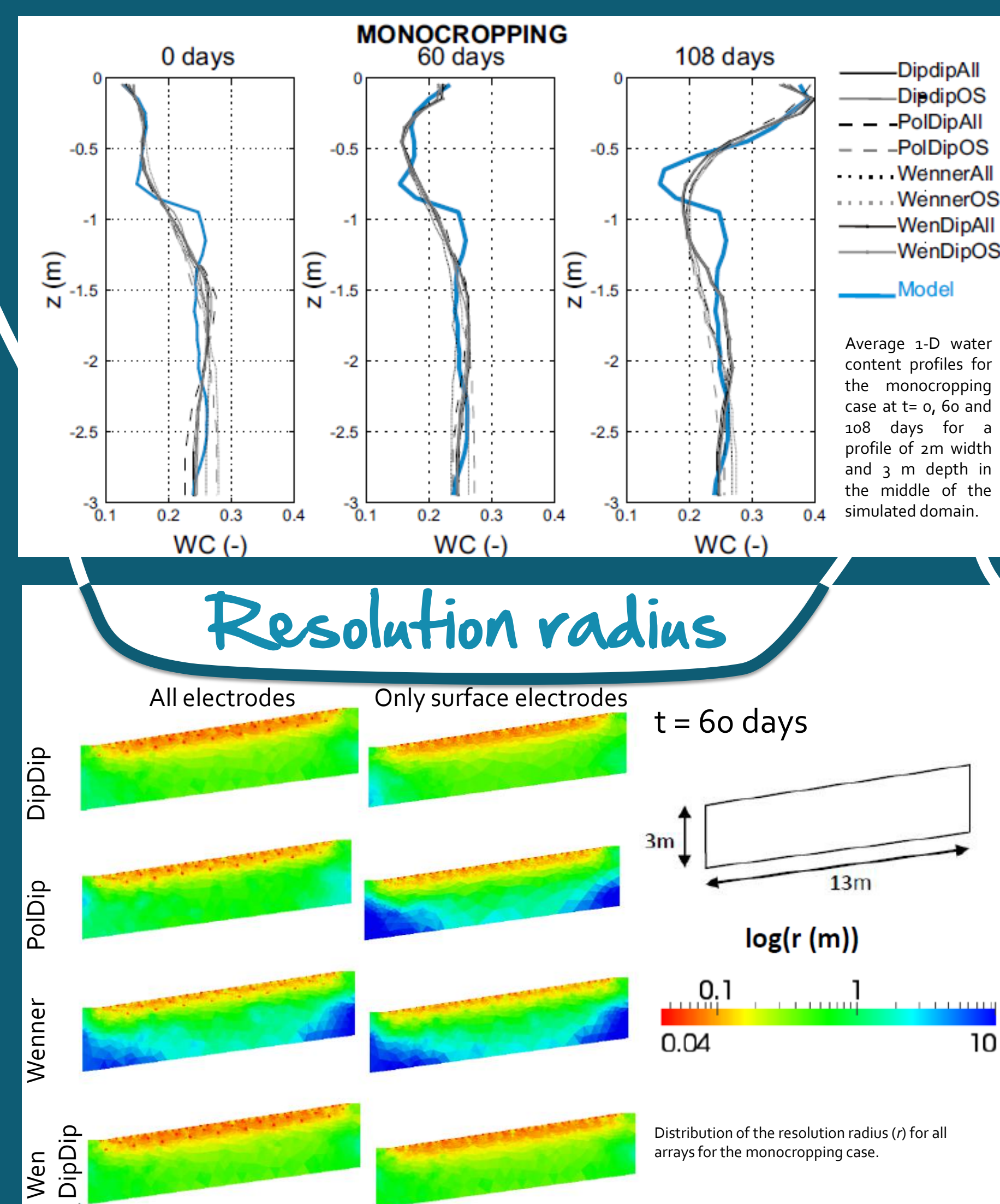
Tested electrode arrays:

- * dipole-dipole
- * pole-dipole
- * Wenner
- * dipole-dipole + Wenner

2 variations:

- * only surface electrodes (OS)
- * electrodes at 0, -25 & -50 cm depth (All)

Resolution radius



Conclusions

- * 1-D profiles generally well reproduced
- * !! Sharp contrasts problematic: due to smoothness constraint
- * Slight underestimation of spatial variability. Spatial structure is detected by ERT, but 'softened'.
- * Best performing array: combination of Wenner & dipole-dipole
- * Additional use of deep electrodes generally improves the result, most of the time, the effect is not very large
- * ERT can be used to observe effects of cropping systems on soil moisture distribution

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