

Activity 3 – ‘Hydrology, integrating land cover and climate’,

PI Esteban Jobbagy,

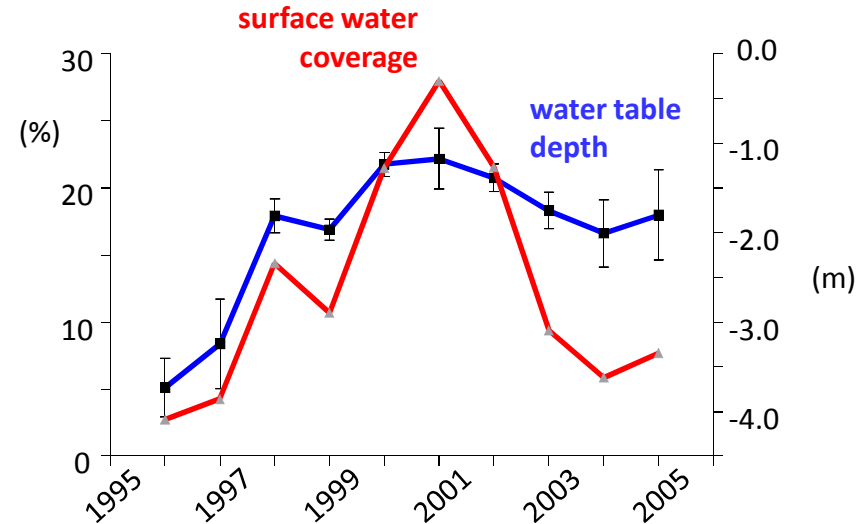
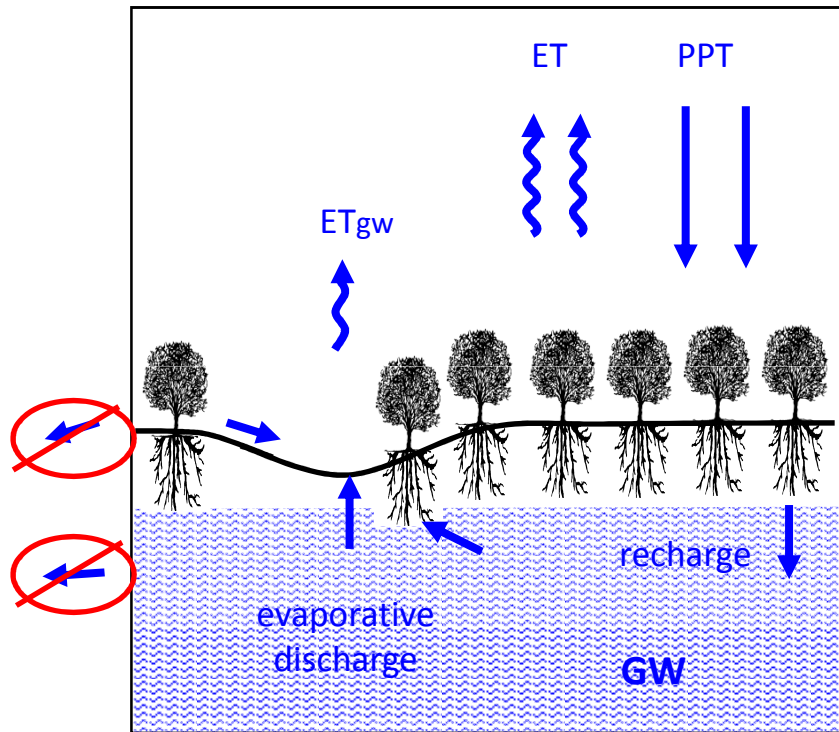
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Ecosystem-Groundwater interactions in the **Pampa** plains

drought / flood cycles (increasing PPT during last 40 yrs)

“hyper-plain”



Aragón et al 2008 – submitted

+ 20 wells, landsat imagery, GRACE

Viglizzo et al 2009 – HESS

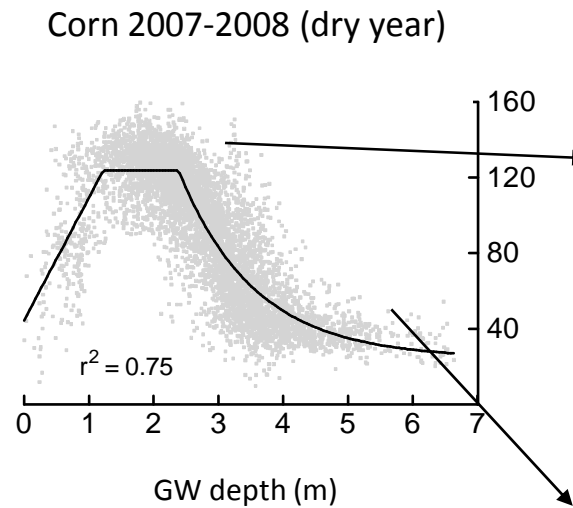
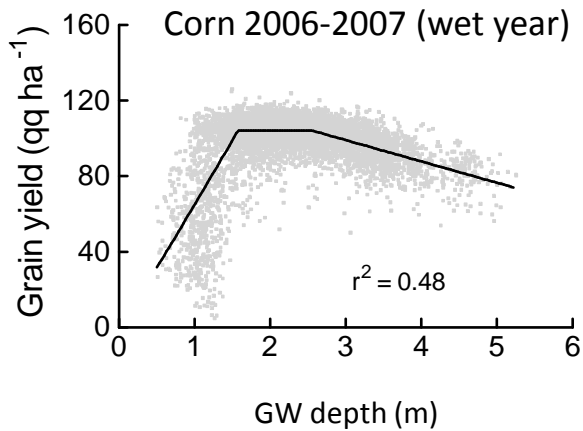
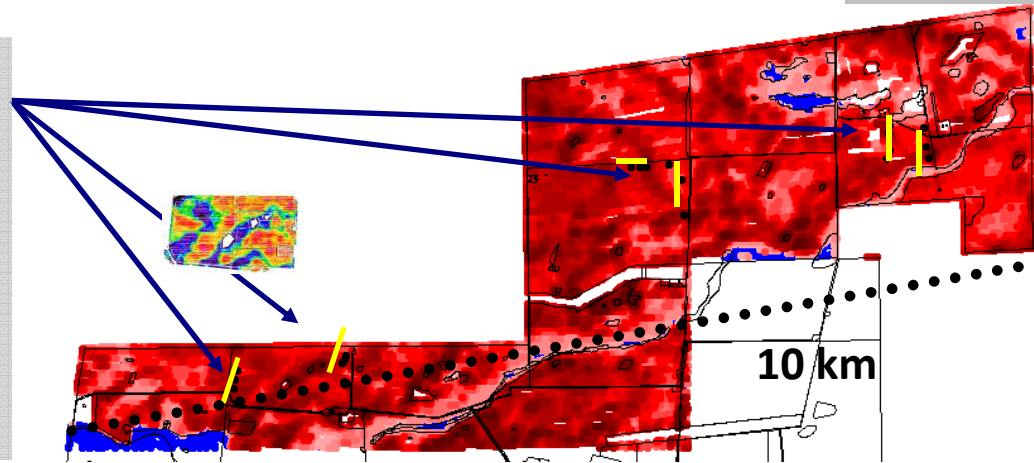
regional assessment

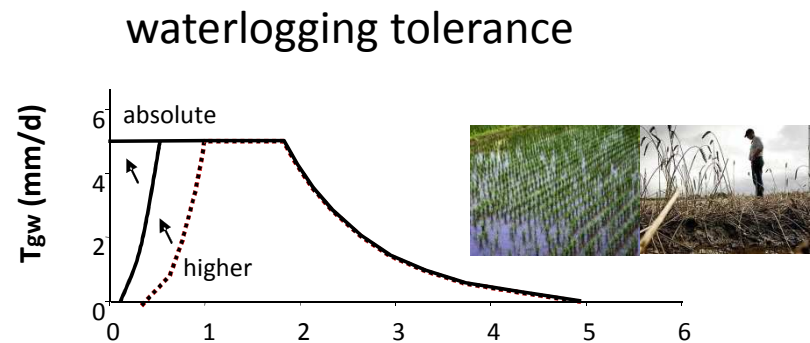
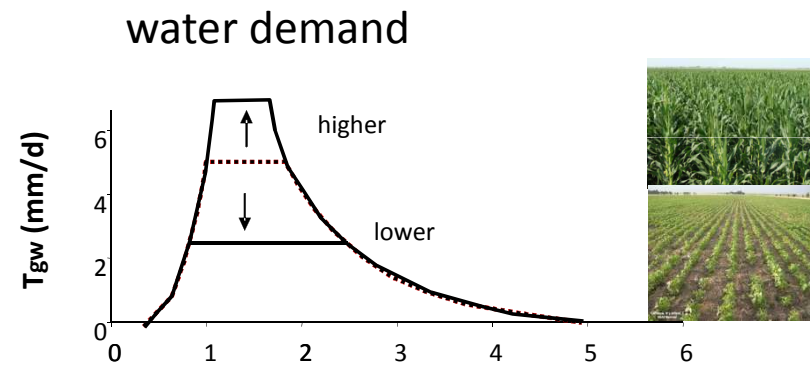
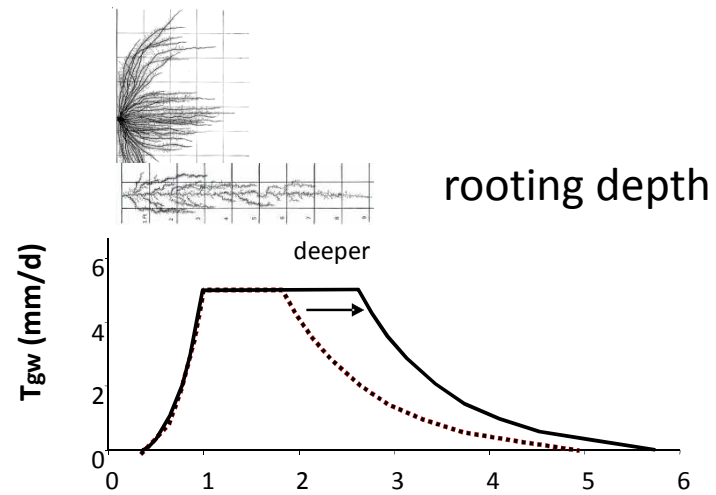


GW level → yield

Western Pampas, sandy landscapes
dominance (75%) of crops

yield maps (harvest monitors)
18 wells, 6 topo transects – 10x10m DEM
Topo model explains GW depth (r^2 0.99)
Crop monitoring & mapping:





UPFLOW MODEL capillary transport and root zone waterlogging

GW level ↔ land use changes

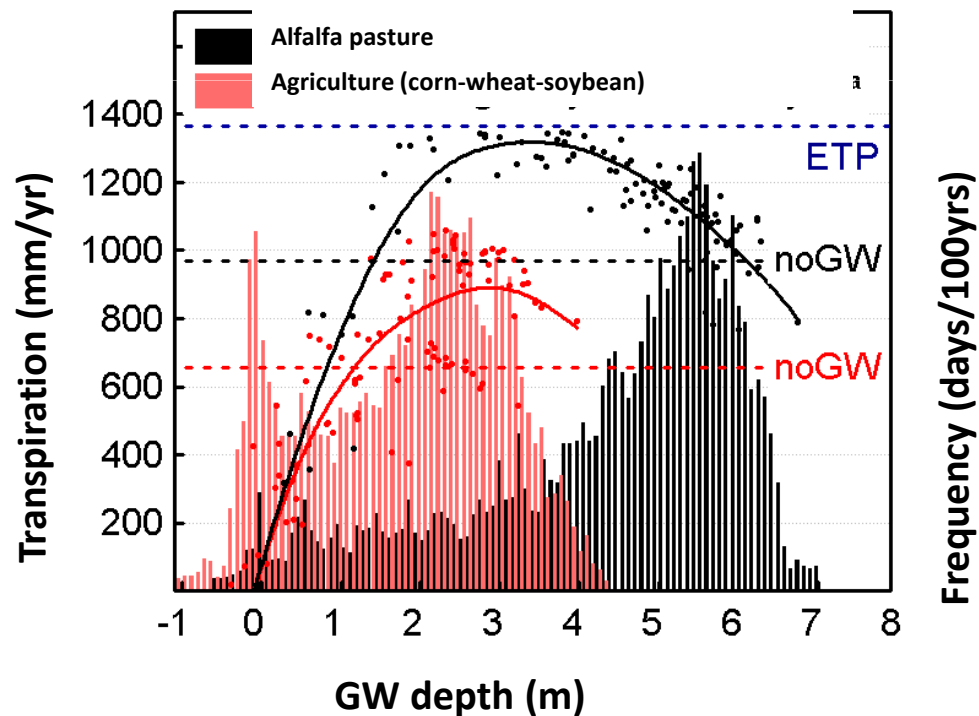
MODEL

OLD (1900-1985)

Perennial deep rooted pastures (Alfalfa pasture)

NEW (1985-present)

Annual crop rotations (Corn/Soybean/Wheat-Soybean)

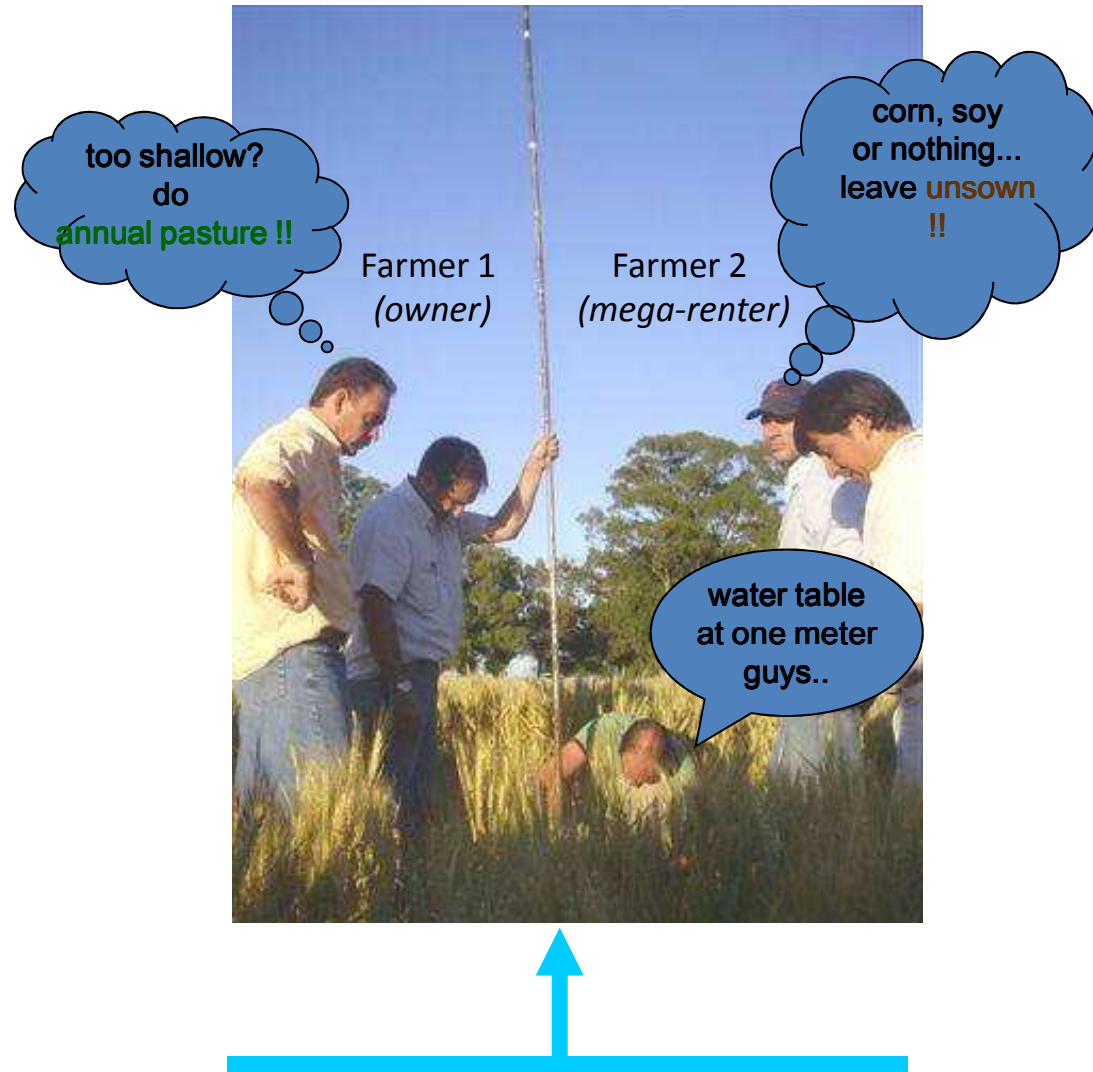


Temporal distribution of GW depth

OLD vs. NEW land use type
sandy soil in western pampas
Last 100 yrs

GW level ↔ farming strategies

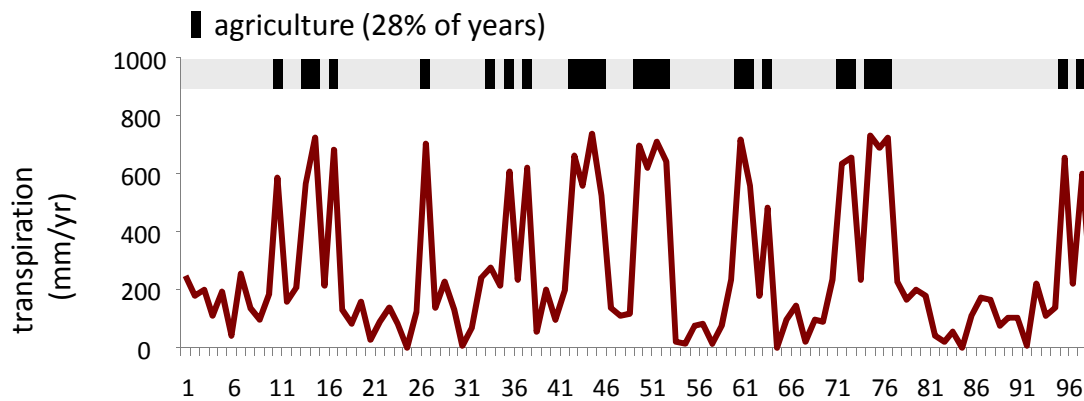
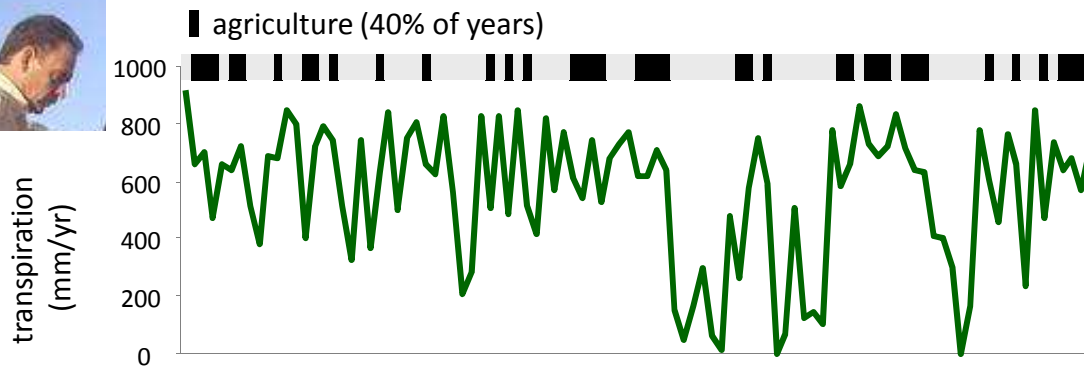
MODEL



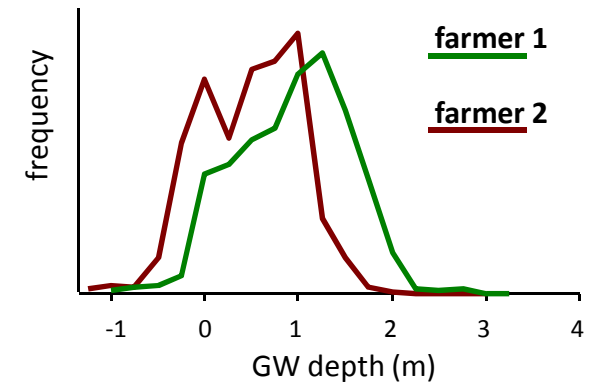
TWO farming strategies
sandy soil in western pampas

Transpiration rates
Last 100 yrs with +20% rain

farmer 1



farmer 2



GW depth distributions

Ecosystem-Groundwater interactions in the **Chaco** plains

Dry Forest deforestation for agriculture

