



Water availability as a driver of spatial and temporal variability in vegetation in the La Mancha plain (Spain): Implications for the land-surface energy, water and carbon budget

Sietse Los

Swansea University, Geography, Swansea, United Kingdom (s.o.los@swansea.ac.uk)

Vegetation is water limited in large areas of Spain and therefore a close link exists between vegetation greenness observed from satellite and moisture availability. Here we exploit this link to infer spatial and temporal variability in moisture from MODIS NDVI data and thermal data. Discrepancies in the precipitation - vegetation relationship indicate areas with an alternative supply of water (i.e. not rainfall), this can be natural where moisture is supplied by upwelling groundwater, or can be artificial where crops are irrigated. As a result spatial and temporal variability in vegetation in the La Mancha Plain appears closely linked to topography, geology, rainfall and land use. Crop land shows large variability in year-to-year vegetation greenness; for some areas this variability is linked to variability in rainfall but in other cases this variability is linked to irrigation. The differences in irrigation treatment within one plant functional type, in this case crops, will lead to errors in land surface models when ignored. The magnitude of these effects on the energy, carbon and water balance are assessed at the scale of 250 m to 200 km. Estimating the water balance correctly is of particular importance since in some areas in Spain more water is used for irrigation than is supplemented by rainfall.