

Climate change and soil security: A soil erosion modelling story

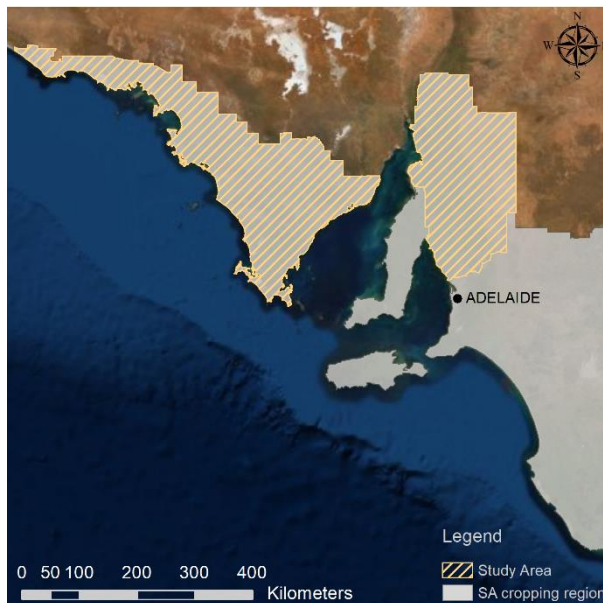
A. Jeanneau^a , **T. Herrmann**^b, **B. Ostendorf**^a 

^a School of Biological Sciences, The University of Adelaide, Adelaide, South Australia, ^b Conservation and Sustainability, Department for Environment and Water, Adelaide, South Australia
Email: amelie.jeanneau@adelaide.edu.au

Abstract:

Soil protection is critical for sustained food production and environmental services. However, soil erosion is a major cause of land degradation globally. Erosion is also expected to increase in frequency and severity due to climate change related extreme weather conditions such as floods, droughts and wildfires. Erosion processes by wind and water have been well described and governments extensively use models predicting the extent of soil erosion for policy development.

Recent technological advances in remote sensing and Geographic Information System (GIS) have been crucial to improve the policy relevance of erosion models. Particularly, the improvement of spatial and temporal resolution of inputs has allowed models to better describe soil loss. Nonetheless, climate change is predicted to have adverse effects on soil conditions leading to an increase in soil exposure. This impact on wind and water erosion is generally treated separately, but both wind- and water-borne processes will influence future erosion dynamics and rates.



This paper addresses the potential to assess the broad-scale effect of climate change on soil erosion by wind and water simultaneously. Here, we describe two of the latest erosion models available and present their spatio-temporal parameterisation for Australian conditions. We used these models to examine the impact of climate change on future soil loss rates and the relative balance of wind to water erosion over time.

Our modelled results will enable the identification of areas most at risk of erosion with a variable climate. These outputs will form the foundation for future best land management practices with extreme events and climate change. Decision makers will then be able to identify potential for improvements, including setting priorities for investment and actions to contribute towards improving soil security for Australia.

Figure 1. Presentation of the study area within the South Australian cropping region.

Keywords: Climate change, erosion modelling, soil erosion, soil security