



Research Title:

*El Niño-Southern Oscillation influence on the dust storm activity in Australia:
Can the past provide an insight into the future?*

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Description: The research project will investigate the influence of the El Niño-Southern Oscillation (ENSO) on dust storm activity in Australia. This will be achieved through major reanalysis of past climate conditions for the past 150 years or more using the global 'ACRE' project which will reconstruct both upper-air dynamics, surface conditions and then all major dust storm events of the past.



Christa Pudmenzky

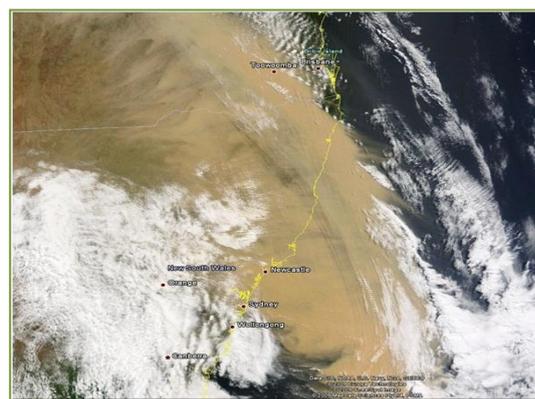
The key research questions that will be addressed are:

- What were the climatic conditions in the long-term past and have they changed?
- What are the drivers of severe dust storm events in Australia?
- Will dust storms become more prevalent and has their intensity changed through time?
- Can the reconstruction of the past climate for the past 150 years or more including representation of upper-air dynamics and surface conditions provide an insight into the future? 1
- Is there a relationship between climate change, low frequency climate variability and increased or changing dust storm activity?

Project Significance: Australia has one of the most variable rainfall climates in the world and observational and modelling results suggest that more frequent or stronger ENSO events are possible in the future. Drought in Australia is probably the most economically costly climate event by reducing agricultural output and having social impacts on rural communities. In addition, a severe decrease in rainfall desiccates the soil and plants in affected areas, increasing the occurrence of dust storms and bushfires. All major continental scale dust storm events have occurred after periods of prolonged drought.

The aim of this research project is to further investigate the influence of the El Niño-Southern Oscillation on dust storm activity in Australia. The reconstruction of the ENSO history using longer-term meteorological data, historical records, and other proxy data that may otherwise have been available (using the ACRE project outputs) provides a far more lengthy and detailed global picture of past ENSO and other climate variability thereby allowing recent climate variability to be assessed from a long-term "multi-proxy" perspective. The resulting dataset can be used to better understand the range of past, present and future climate variability and the influence these have on the dust storm activity in Australia.

In addition, the information gained can provide an independent means of verifying climate model simulations. Results of this study will provide a better understanding of the underlying mechanisms responsible for climate change in order to employ adaptation and mitigating measures.



September 2009 dust storm