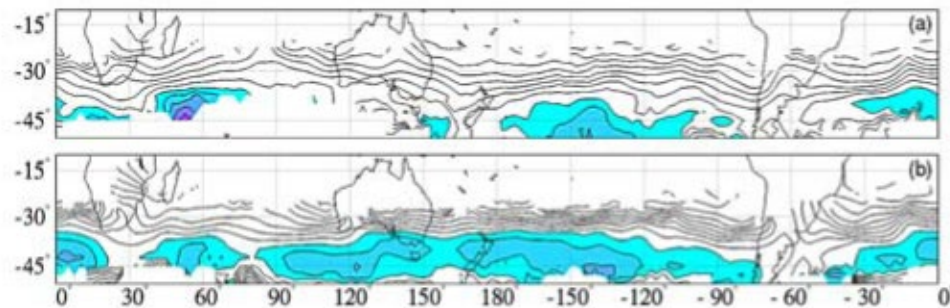
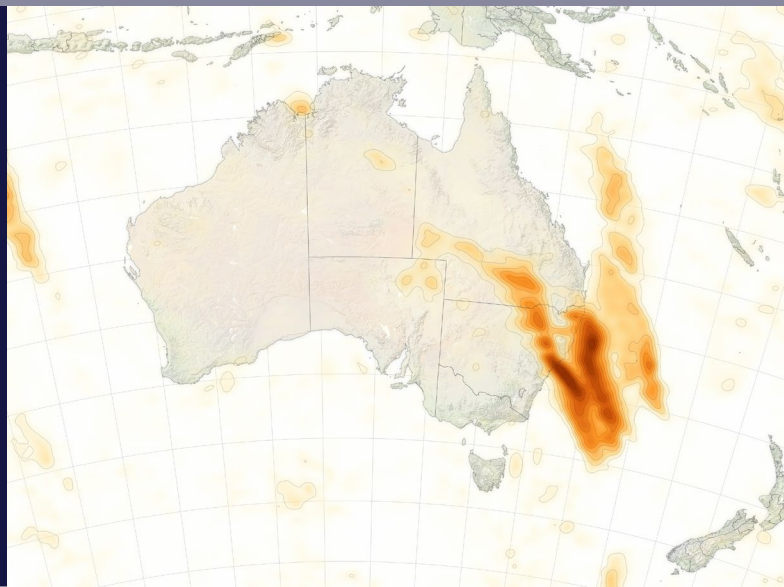


Northward expansion of the westerlies over glacial southeastern Australia: *evidence from lunette dunes, basalt plains, and wind modelling*

13 February 2019;

NASA Earth Observatory



GCM: present day (top) vs. LGM (bottom)
(Wardle, 2003)

Hypothesis: cold, dry, windy LGM

Aeolian sedimentary deposits provide possible “proxy” evidence

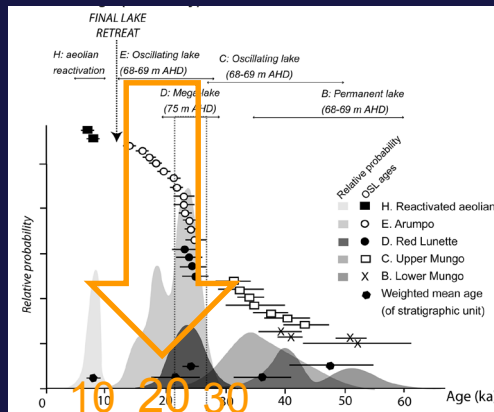
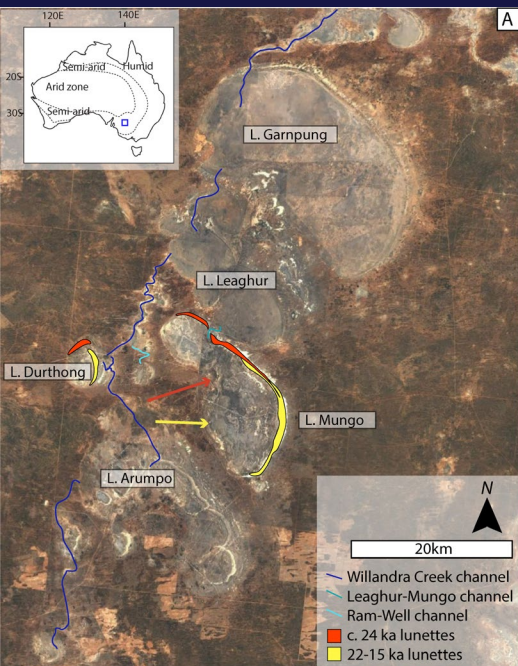
- Stratigraphy, geomorphology, OSL dating

Climate modelling provides independent test

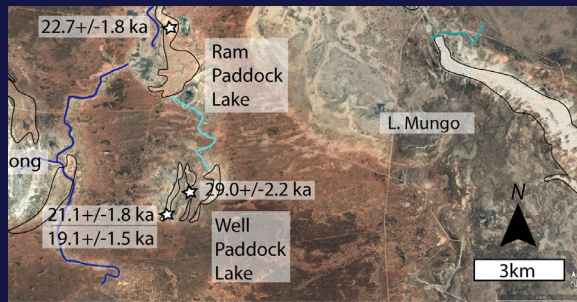
- Present-day + LGM: wind regime statistics, back trajectories for 20, 60, 120 μm particles

We confirm active LGM lunette dune deposition in semi-arid Willandra Lakes

Chain of lakes;
Transverse lunette dunes
on downwind margins

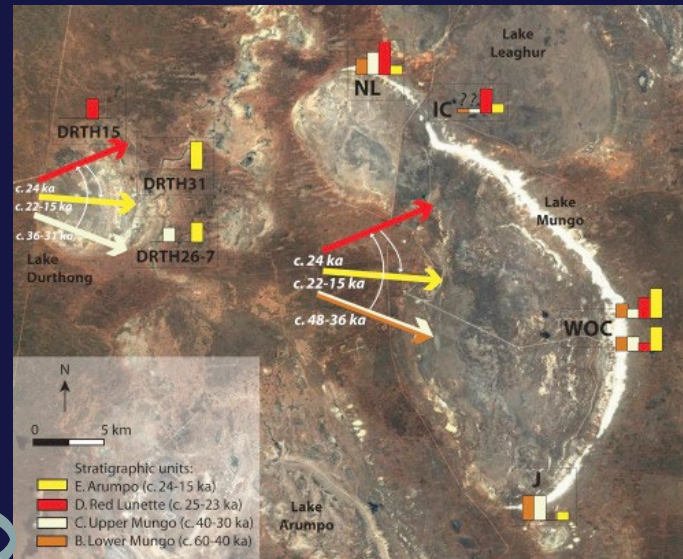


Final lunette phase 24-19ka
New data fit framework



Fitzsimmons et al. 2015

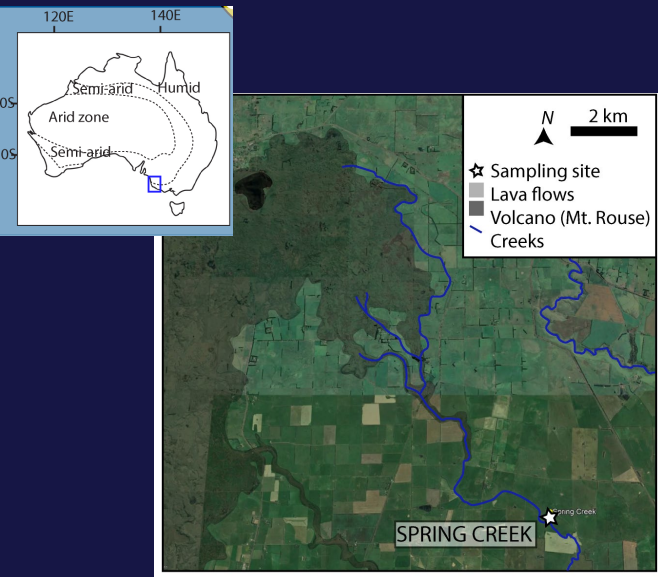
This study



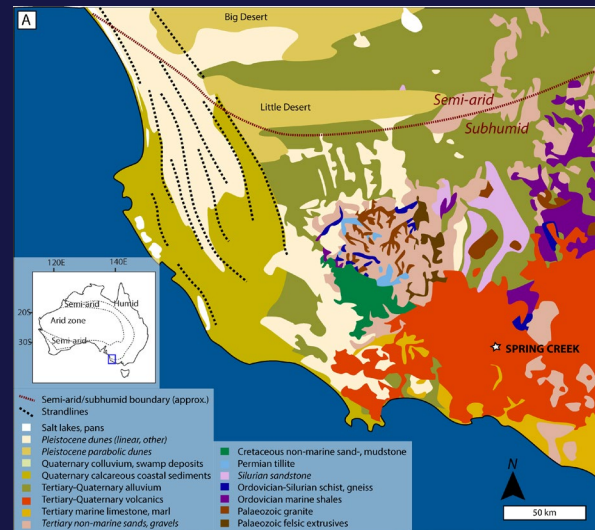
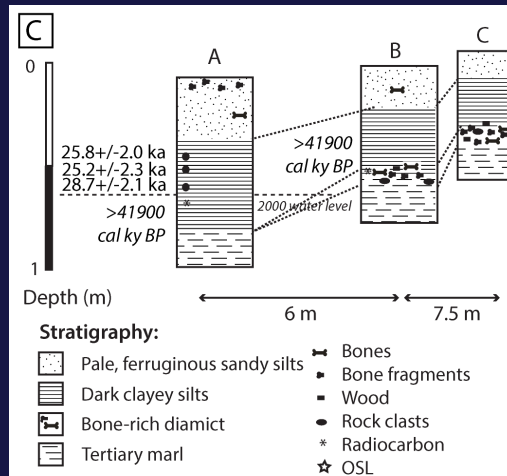
Fitzsimmons 2017

LGM lunette morphology:
WSW-erly transport shifting to
W-erly transport over LGM

We identify aeolian sand incursions onto temperate Western Victorian basalt plains from 29ka



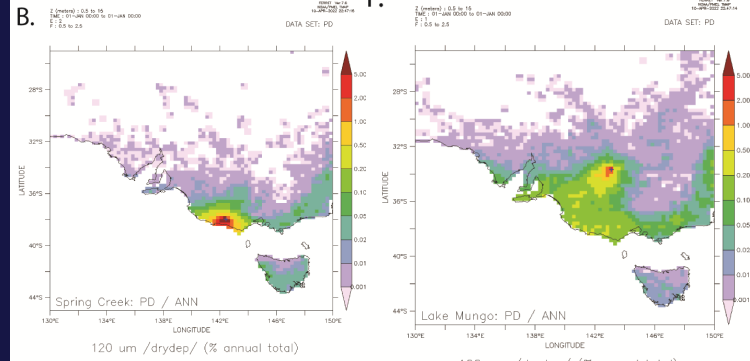
Clay-rich silts date to 29-25 ka;
Overlain by pale aeolian sandy silt



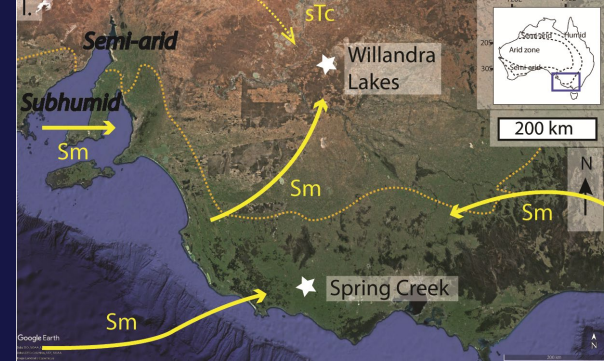
The site sits within
a basalt catchment

Nearest aeolian sands lie
50 km to W and S

PRESENT DAY:
120 μm
trajectories

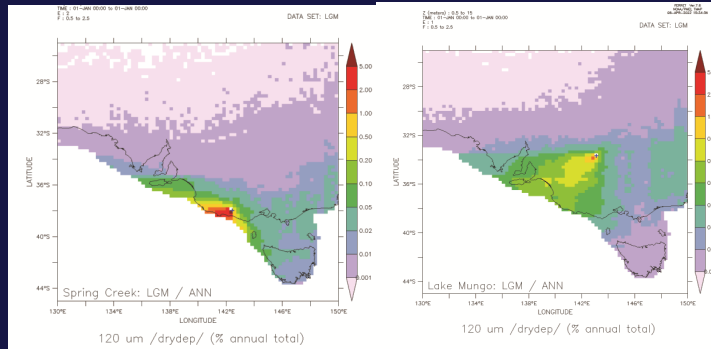


Synoptic-Scale
circulation



Simulated LGM near-surface winds indicate stronger westerlies
onto continent;
Stronger potential for distal aeolian transport onto basalt plains,
enhanced aeolian activity in semi-arid zone

LGM:
120 μm
trajectories



Proposed
LGM
Synoptic-Scale
circulation

