THE ROLE OF AIRSHED MODELLING IN THE IMPLEMENTATION OF NATIONAL ENVIRONMENTAL STANDARDS FOR AIR QUALITY IN NEW ZEALAND

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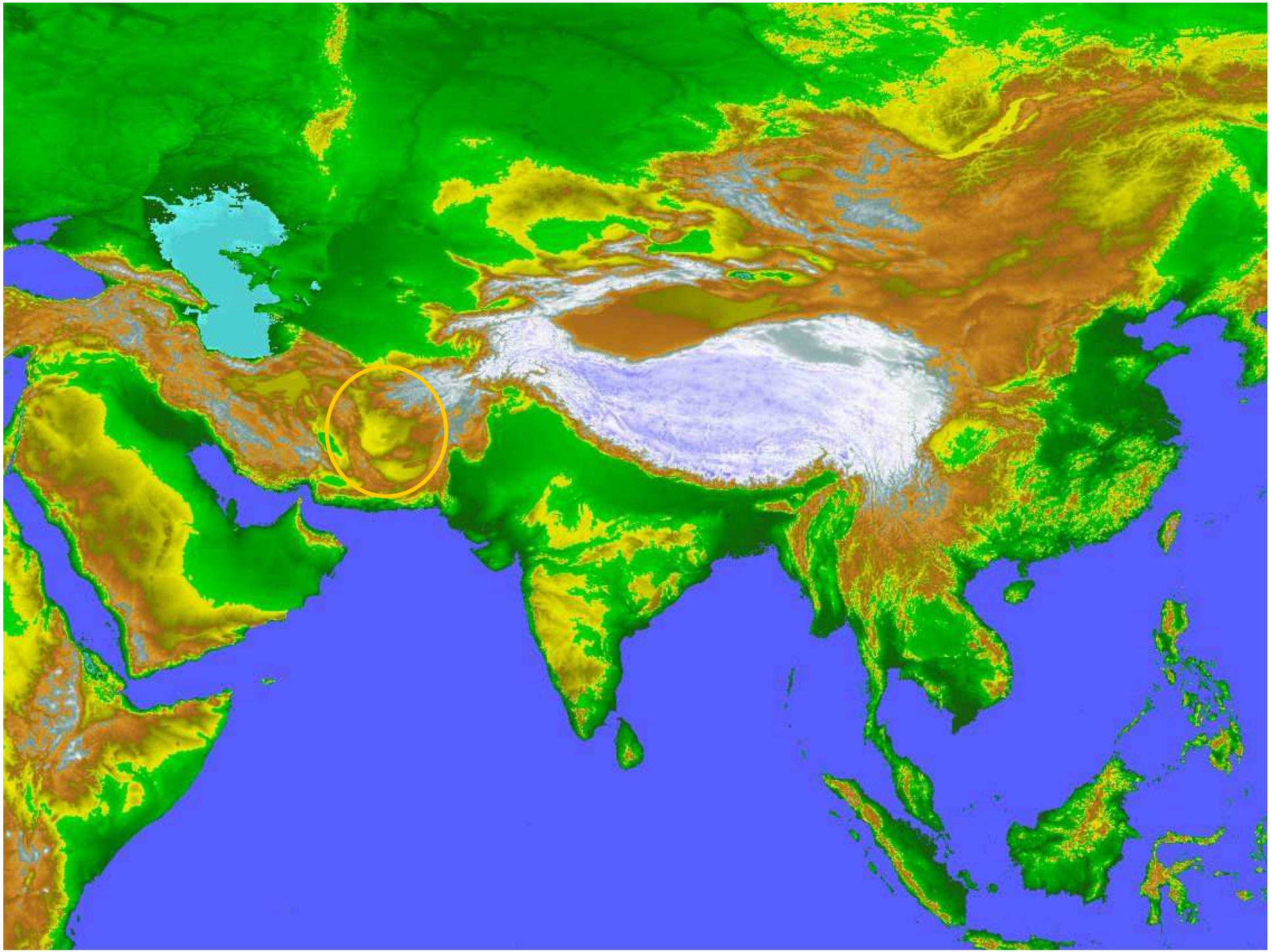

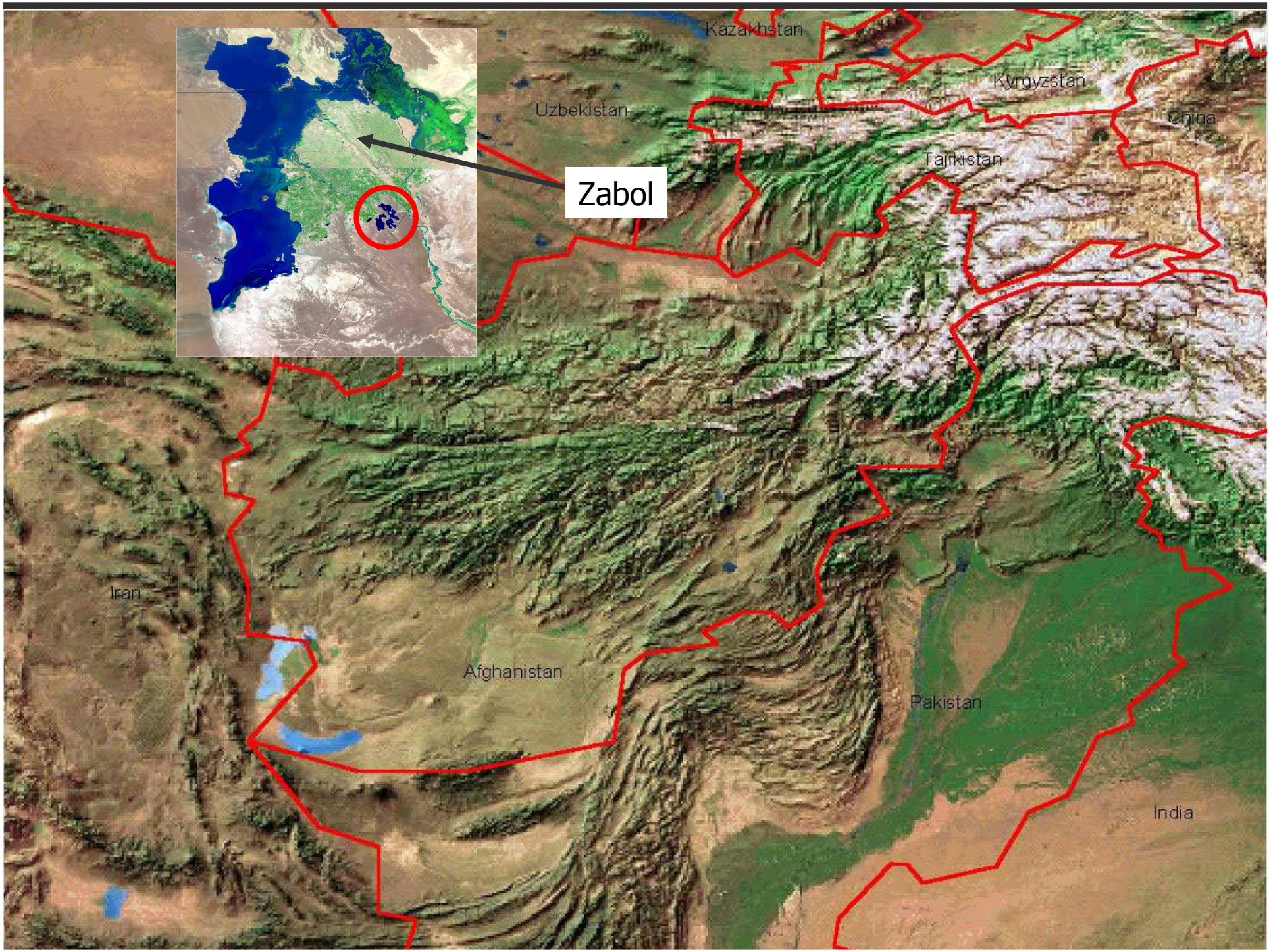
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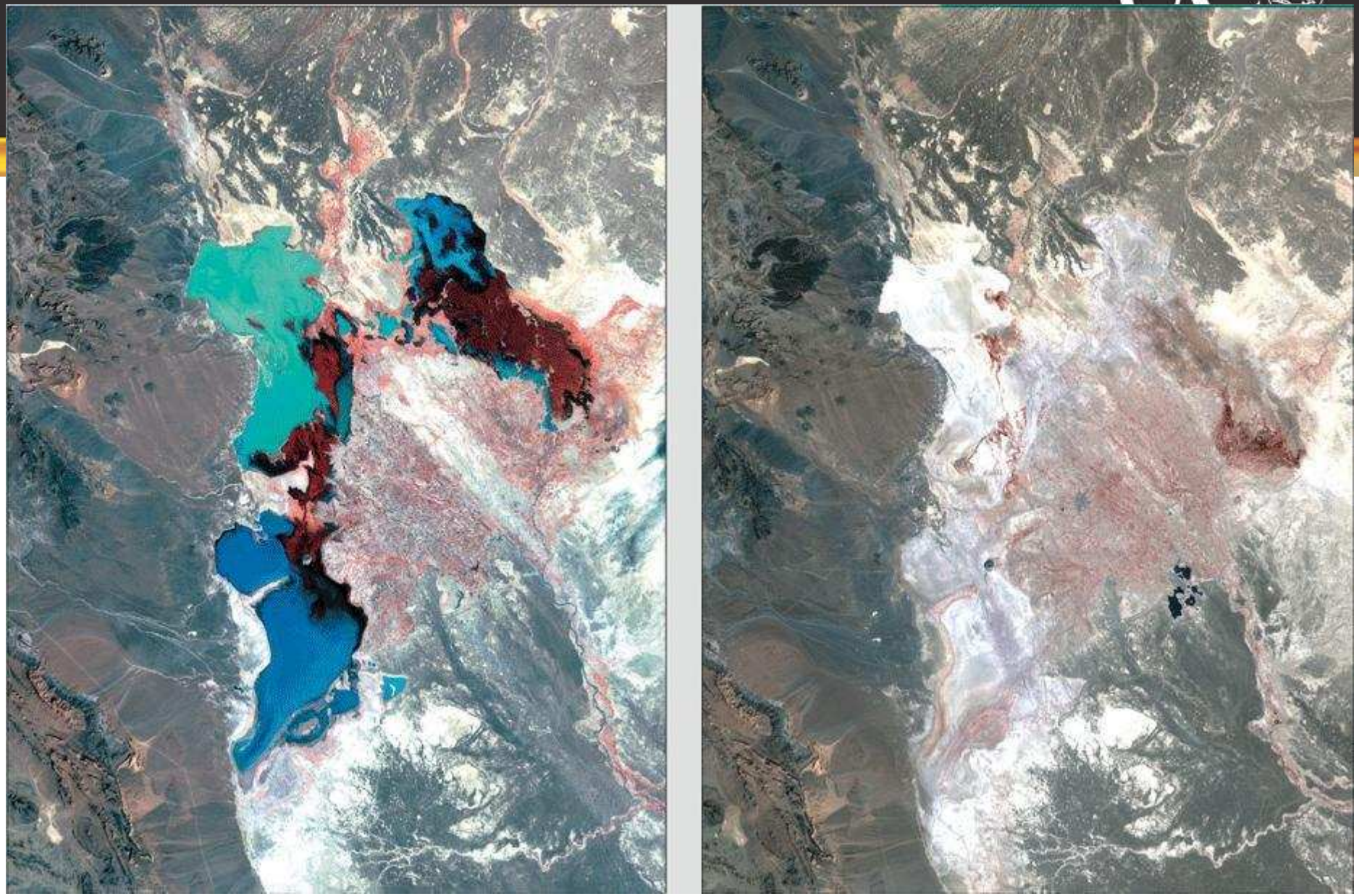
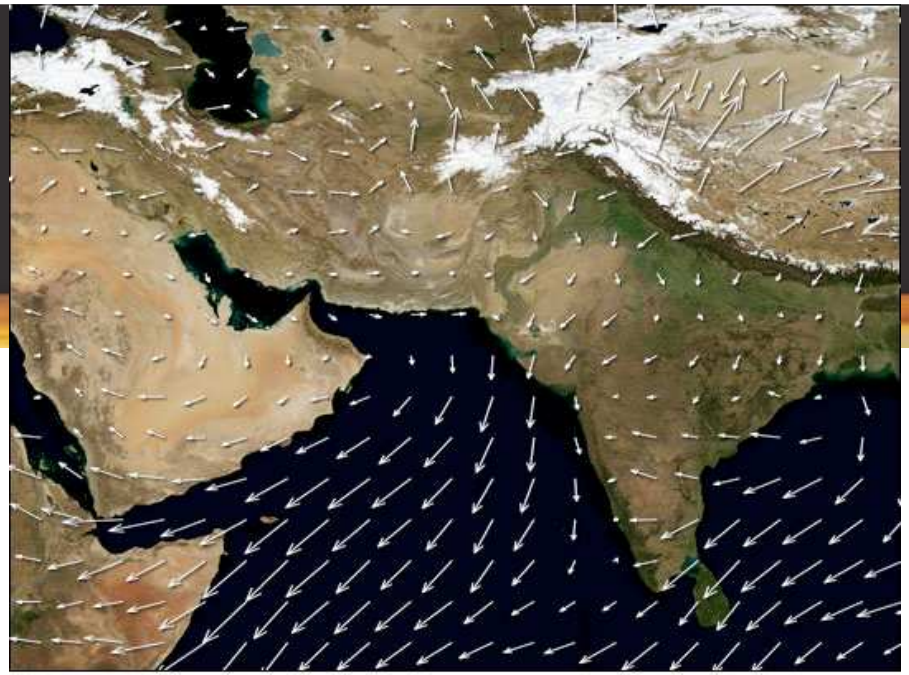
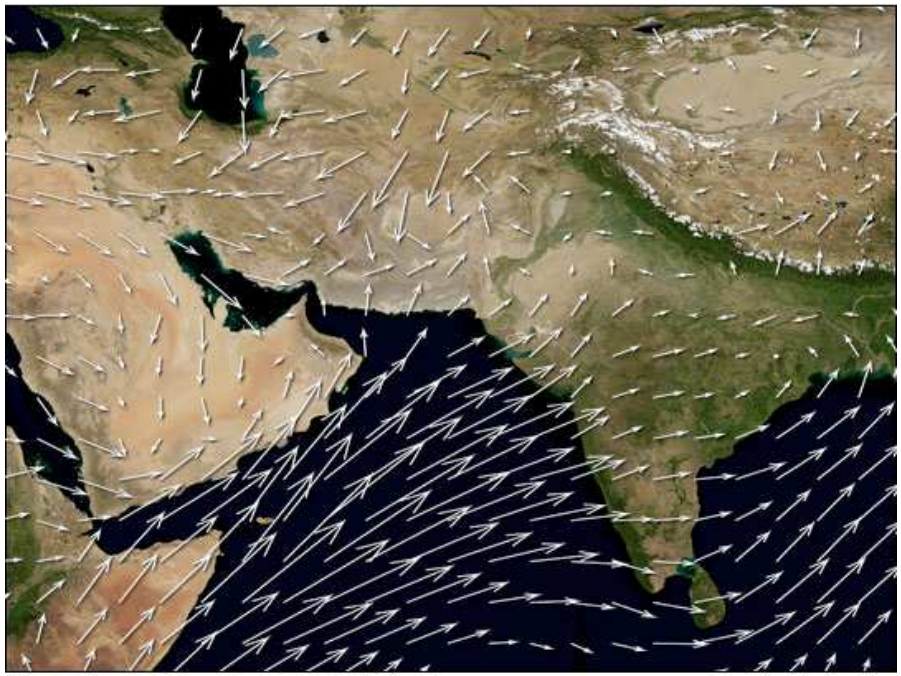




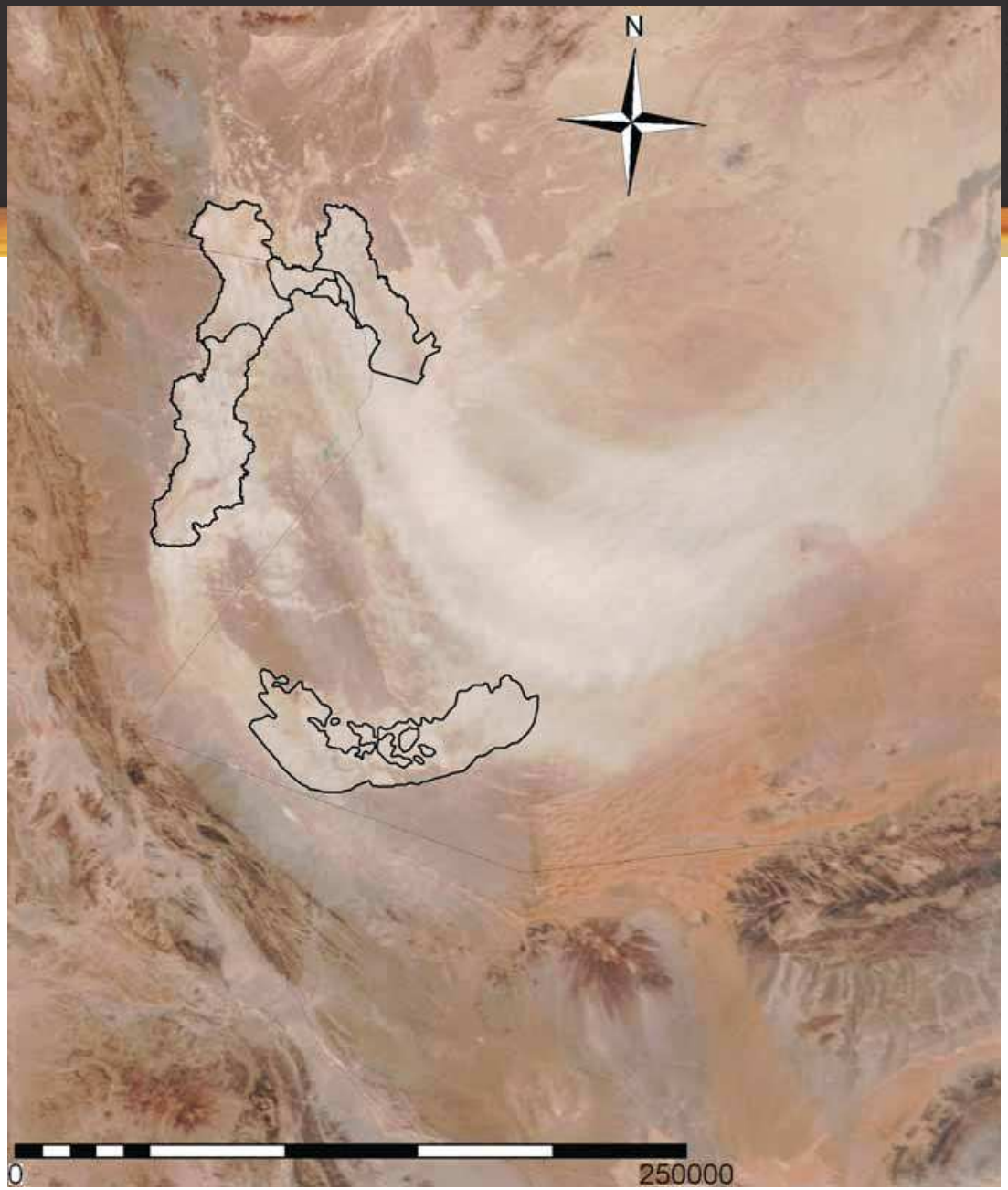
Winter



Summer

250 km

Wind Velocity of 15 meters/second



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2006/07/02

MODELLING PM_{10} AIR POLLUTION DISTRIBUTION WITHIN AIRSHEDS

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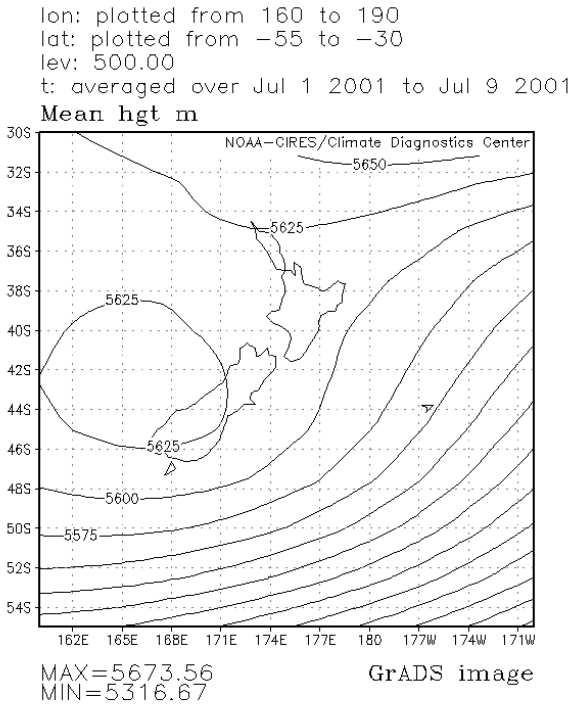
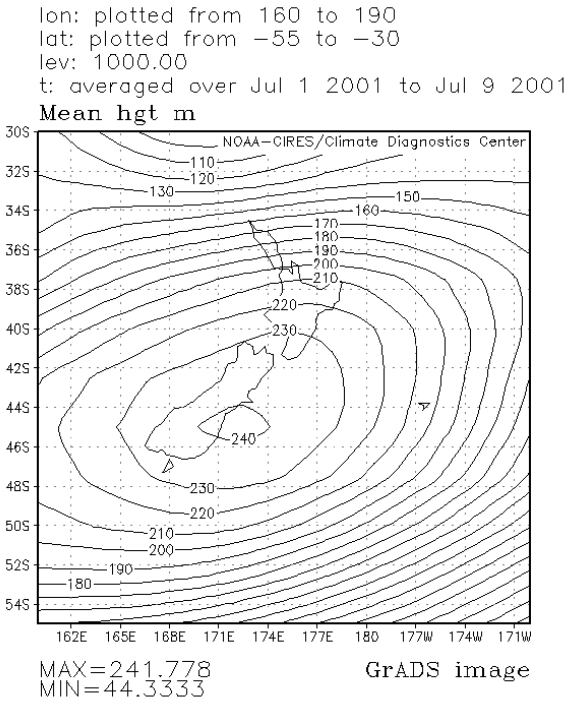
- Mesoscale atmospheric models can predict spatial and temporal variation of the wind field and atmospheric structure over complex terrain.
- These models can be meshed with atmospheric chemistry models/modules that predict spatial and temporal variations in chemical composition.
- For that, they need good quality emissions information (in both time and space).

SYNOPTIC CONDITIONS – IDEAL FOR A 9-DAY PERIOD





- Average maps of 500 hPa (~5 km) and 1000 hPa (surface) for 1-9 July 2001

NES compliance everywhere in the airshed?

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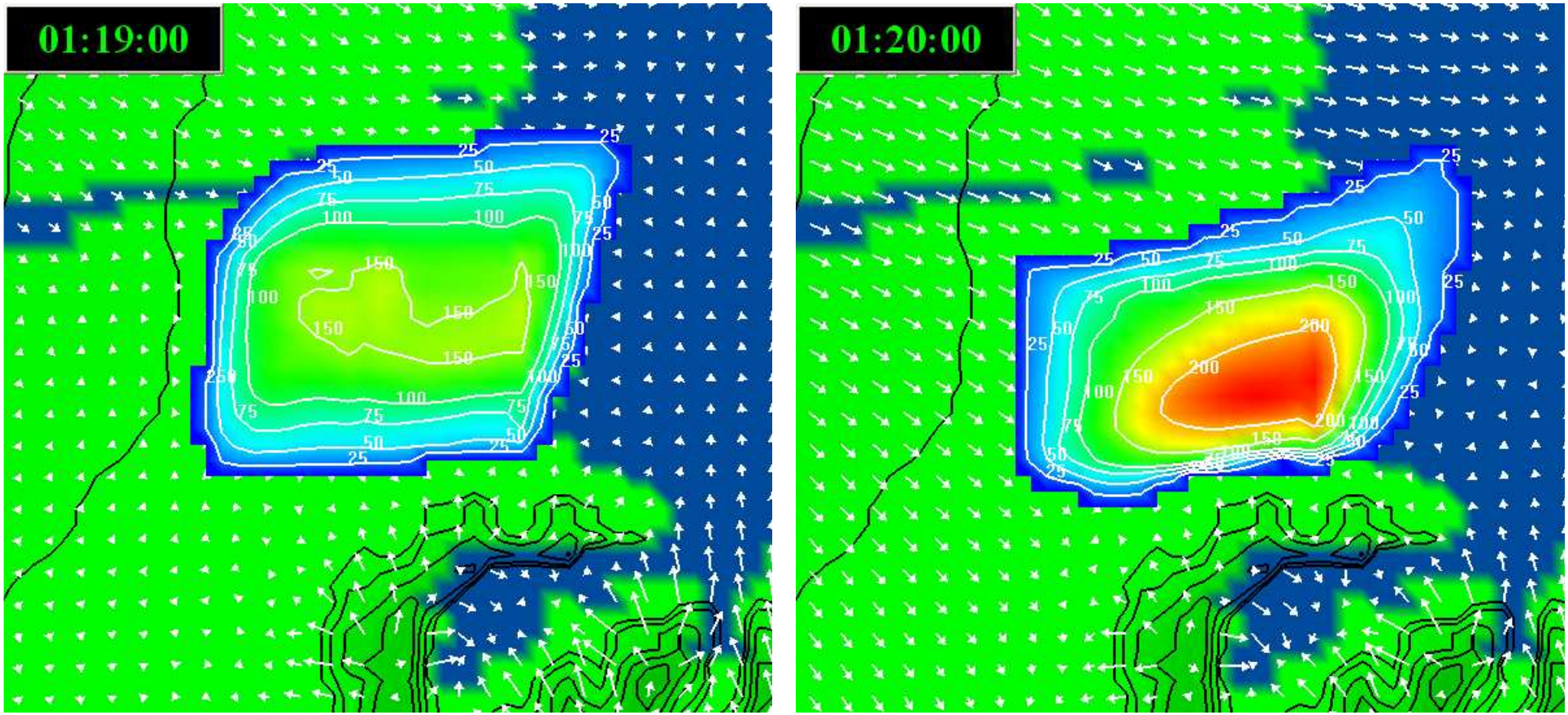
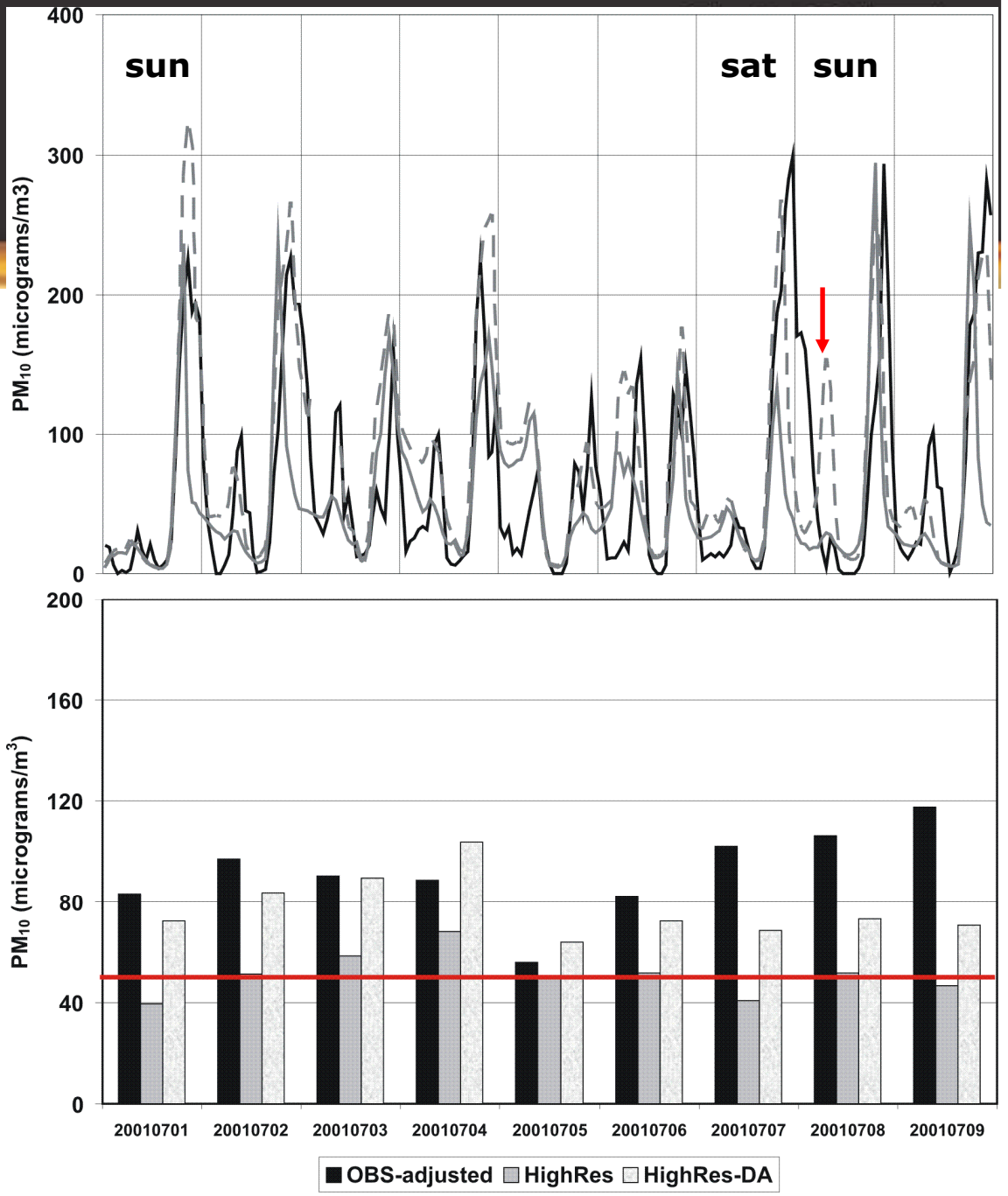


PM_{10} concentrations on the first day

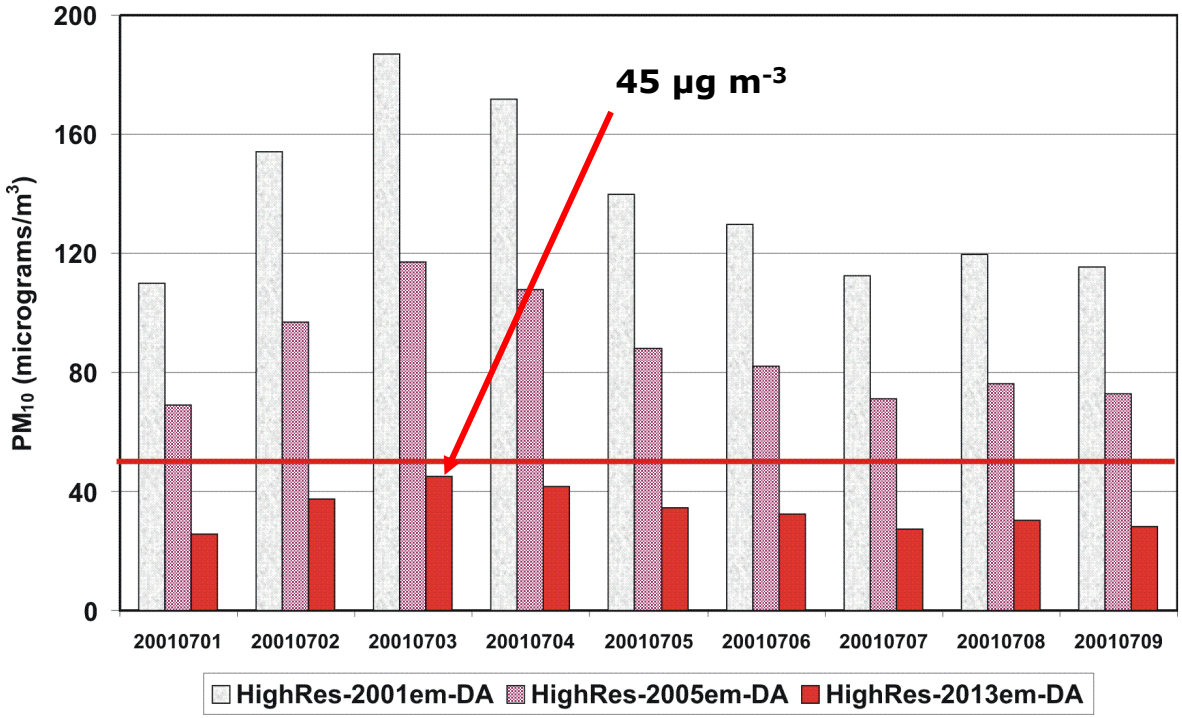
Need to find a period when model performs best

- Best fit to measured data at St. Albans (1–9 July 2001).
- Observations (black), TAPM (grey), TAPM+DA (grey dashed).
- The second Sunday highlights problem with emission inventory (weekend).
- Saturday night late peak.
- Differences between modelled and observed 24-hour PM_{10} due to variation in emissions and/or meteorology.



Evaluating scenarios

- Using same meteorology for different emission scenarios.
- Even with a limited period of simulation, there is a likely potential for Christchurch airshed to be NES non-compliant.
- Note: Background concentrations are not added to the simulations.



Maximum values anywhere in the domain

Conclusions

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- Modelling of atmospheric processes in airsheds can assist in:
  - identifying parts of airsheds likely to experience the highest values of PM_{10}
  - the location of monitoring sites (note that reduction strategies are based on worst case monitoring, but that under some conditions worst case concentrations may occur at various sites depending on meteorological conditions)
  - the development of appropriate emission reduction scenarios
  - evaluating progress towards meeting the new standards by the target date of 2013