

# A Base Climate Dataset for Victoria

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# Scientific and Applications Objectives

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- Produce a 35-year daily high-resolution gridded fire weather/fire danger dataset for Victoria
  - Long-term homogeneous temporal and spatial dataset (fills in big gaps)
- Provide decision-support information for fire management
- Provide background information for climate change analyses

# Relevance and uses

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- Estimating climate related bushfire risk
- Estimating number of days suitable for planned burning
- Input into the allocation of fire management resources - including planned burning
- Bushfire case study analysis, refinement and improvement of burning prescriptions
- Development of climate envelopes for vegetation communities
- Development of weather predictions for "fire use" decision making, and future bushfire climate predictions for strategic planning
- Provides hourly high-resolution weather input for fire spread models

# Products

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- A 35-year (Sep-Apr) dataset of daily fire weather elements – noon, 3pm, 9a-9a maximum/minimum values
  - Temperature
  - Relative humidity
  - Wind speed and direction
  - Precipitation
  - Evaporation
  - Solar radiation
  - FFDI
- Climatology statistics of the elements

# Methods

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- MM5 numerical weather prediction model
- Assess model output (validation)
- Bias correction

# Why not always use just observations?

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- Most observations are not in forest mountain areas
- Observations change in time
- Network; instrument; site location changes
- Pre-AWS estimated wind observations
- There is no physical basis for interpolation between observations

# Numerical Weather Predictions

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- Fifth Generation Penn State/NCAR Mesoscale Model (MM5) Model output validation
- MM5 is a community model that can be applied to real-time and historical studies of a large spectrum of weather events: mesoscale convective systems, fronts, land-sea breeze, mountain-valley circulations

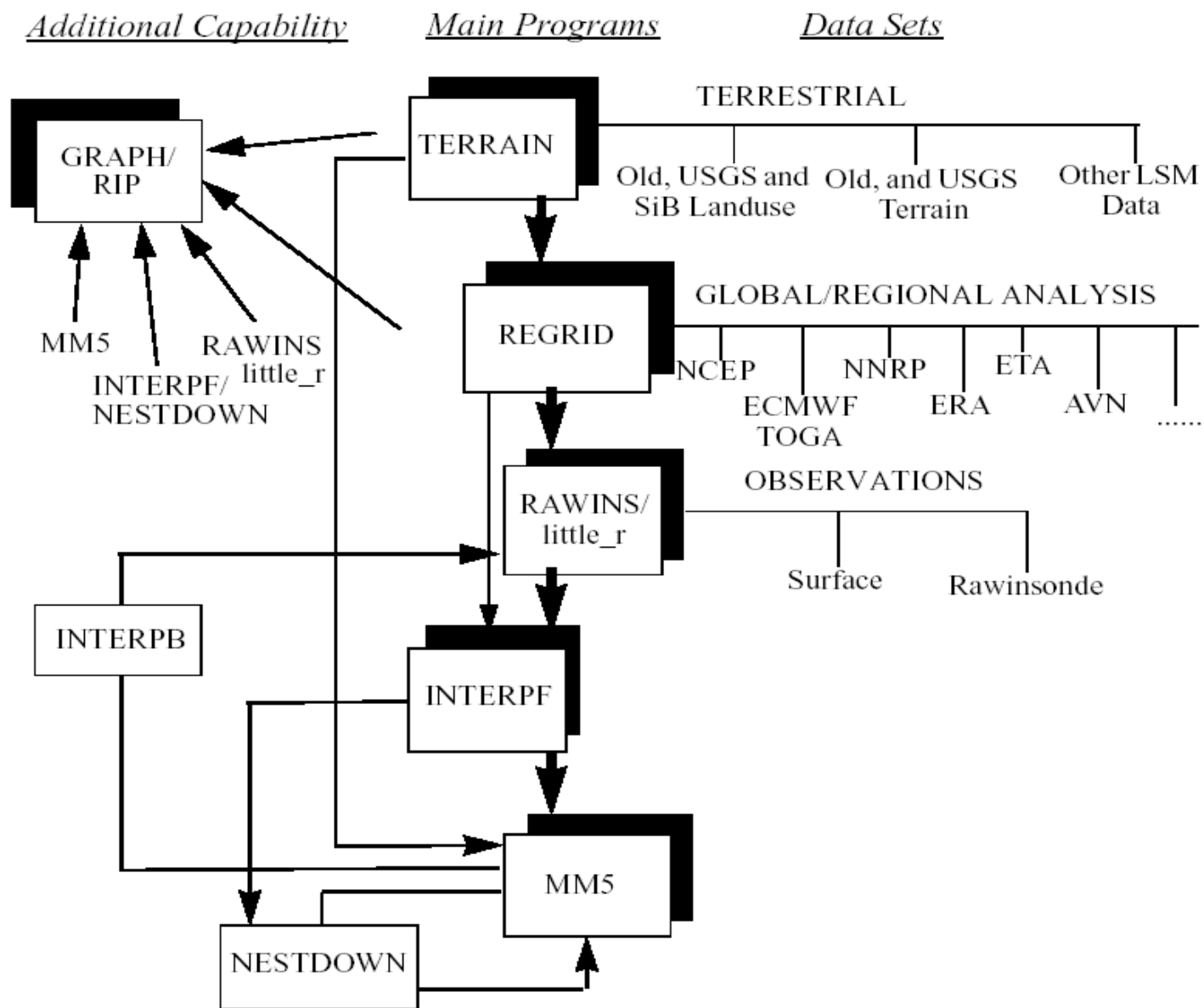
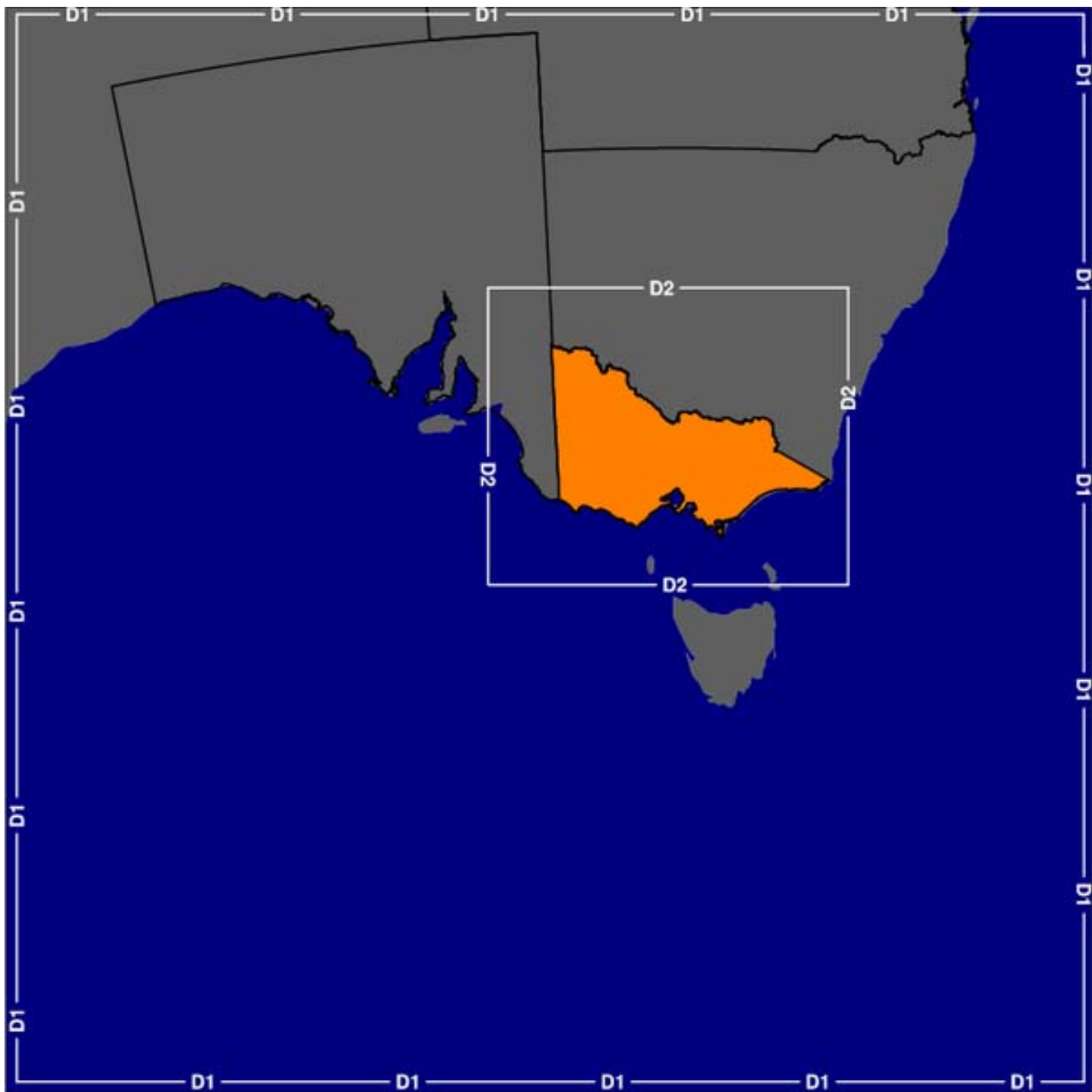


Fig 1.1 The MM5 modeling system flow chart.





# 6-km grid size

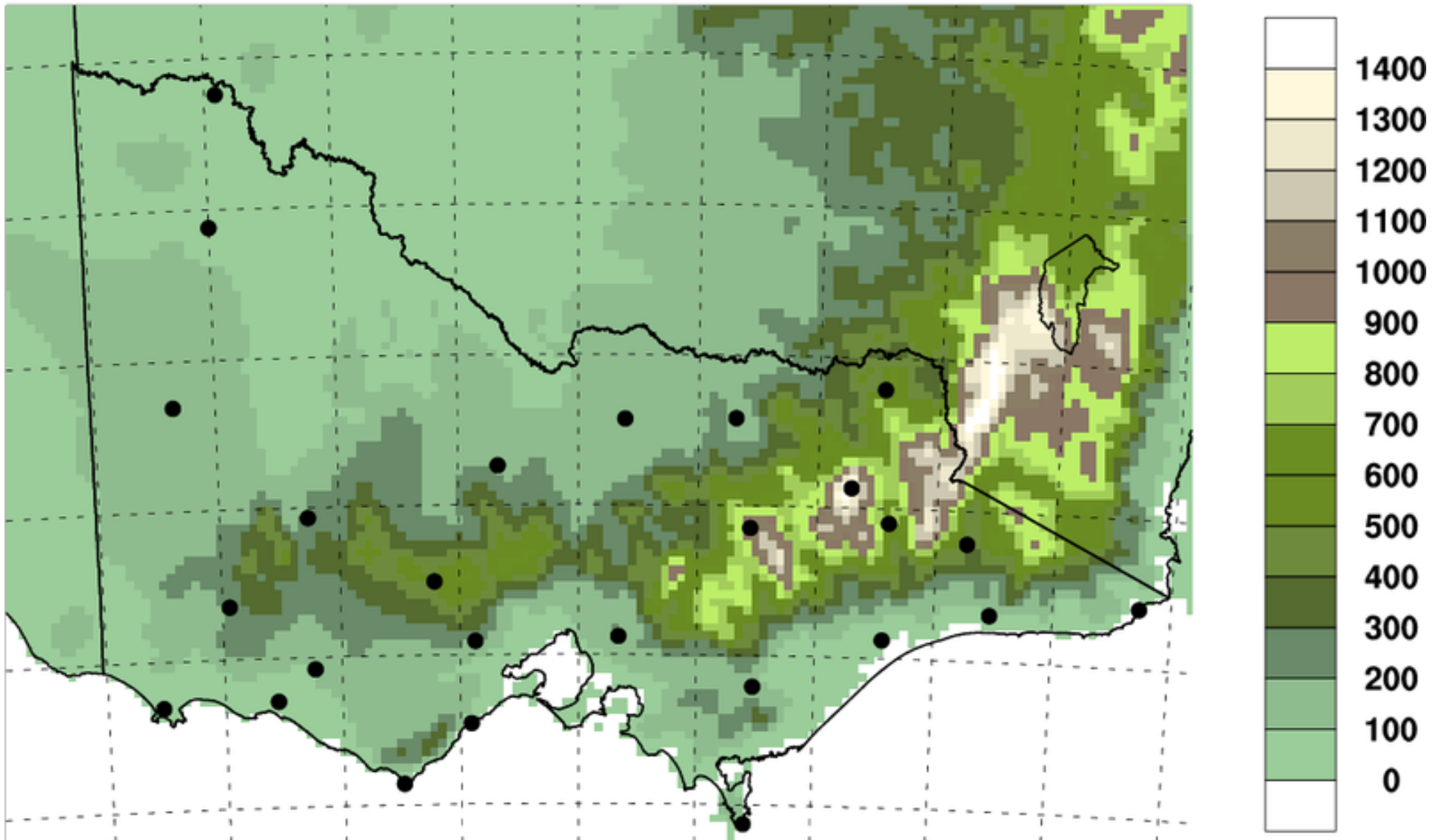
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- Latitude grid points = 142
- Longitude grid points = 172
- Total grid size per hour = 24,424
  - Per day = 586,176
  - Per year = 213,954,240
  - Per 35 years = 7,488,398,400

# Model terrain

Terrain Height

m



# Validation

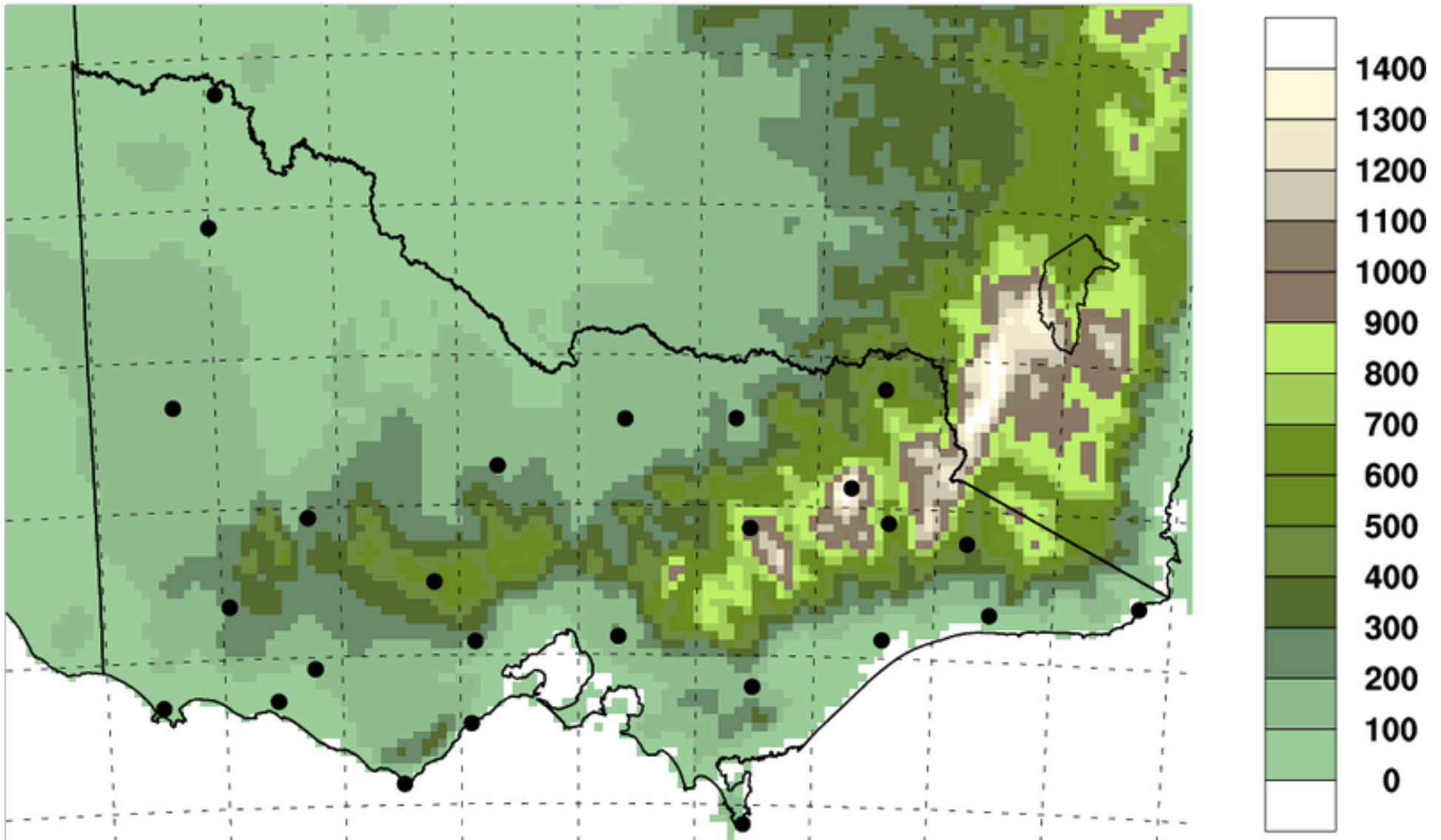
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- 26 station observation points (1997-2006)
- Compare station values to corresponding grid point values

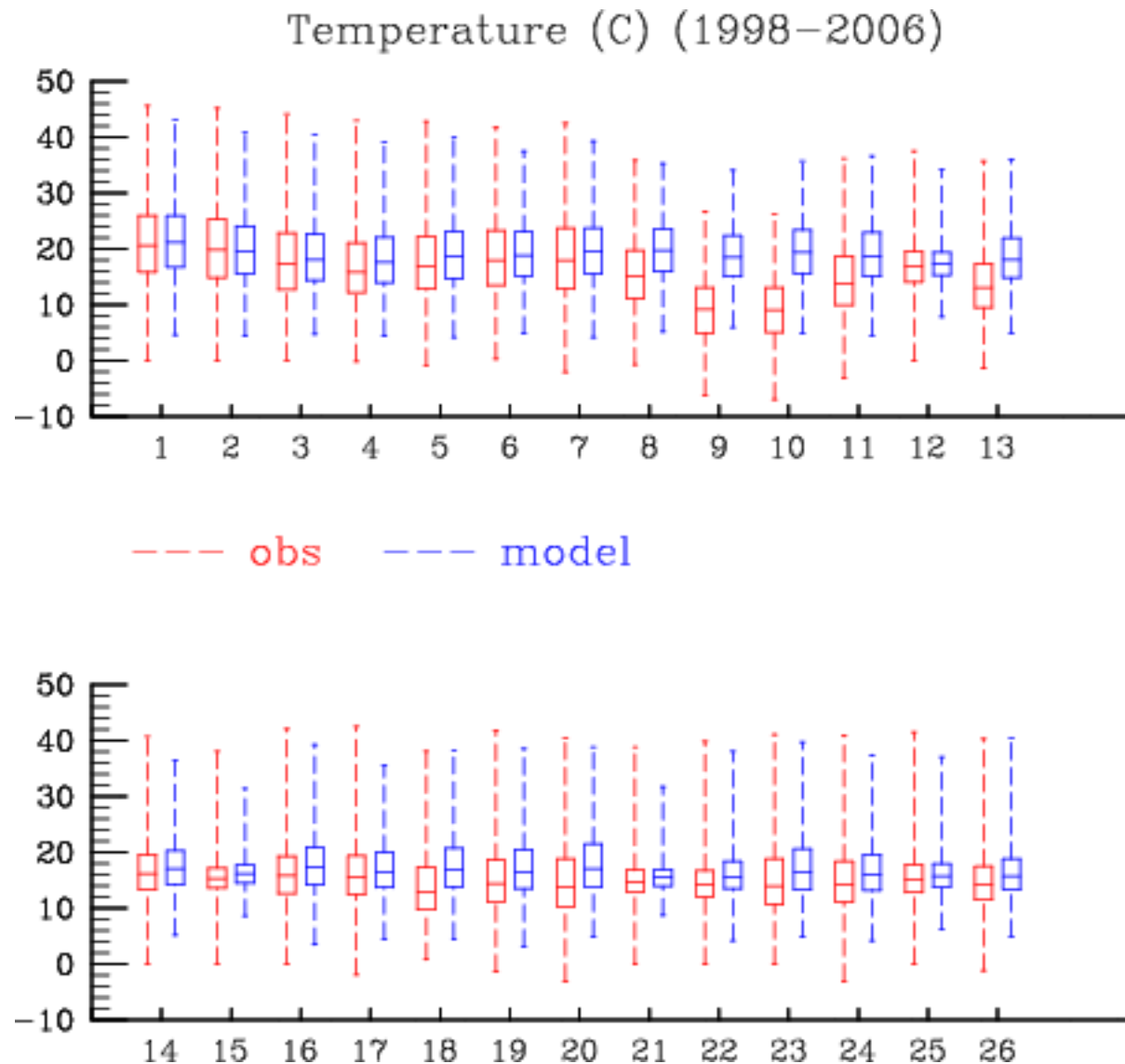
# Station locations

Terrain Height

m



# Distribution comparison of temperature

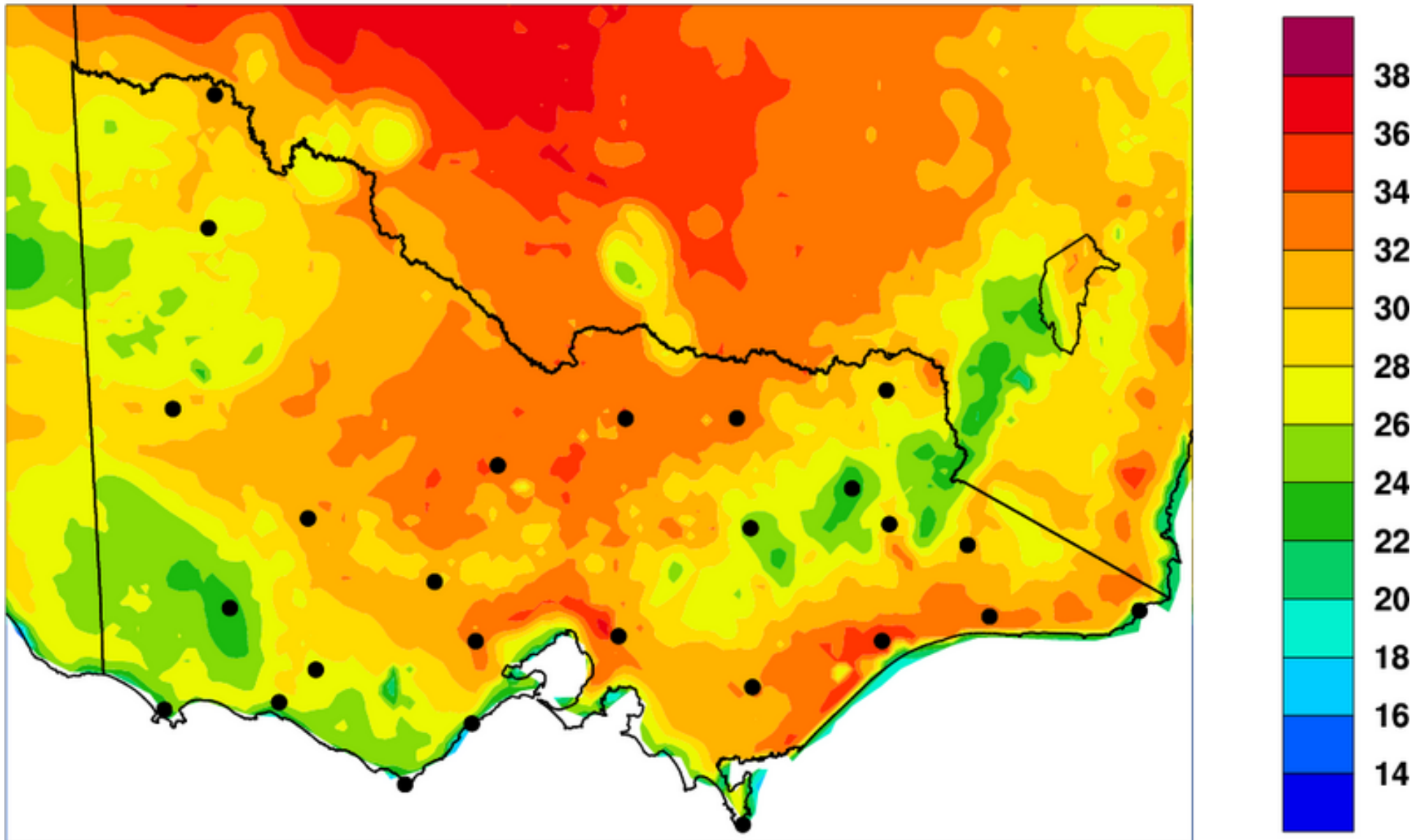


# Example case: Original MM5

Dec 10, 2006 12:00 EST

Surface Temperature

C

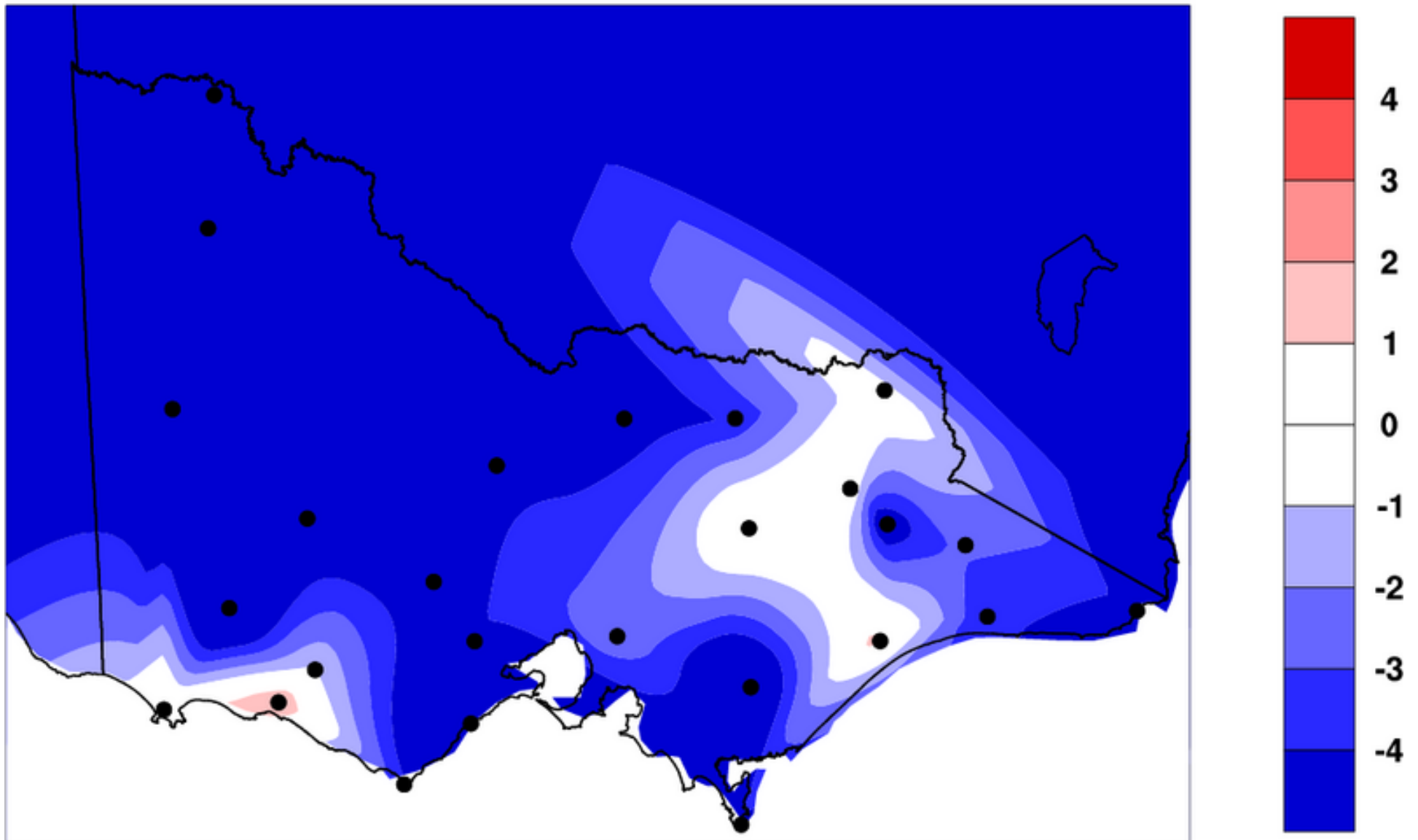


# Example case: Bias

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Surface Temperature

C



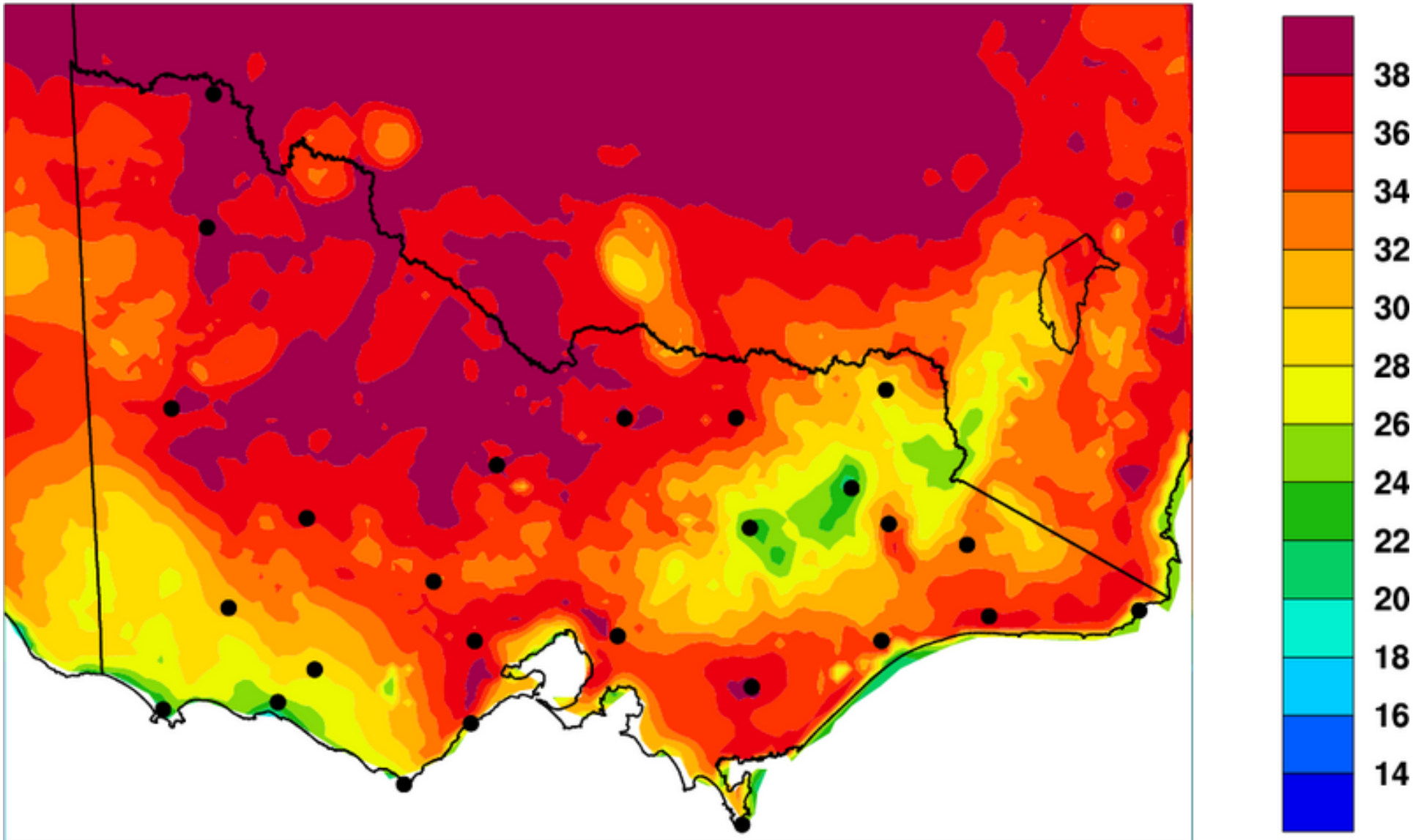


# Example case: Bias corrected

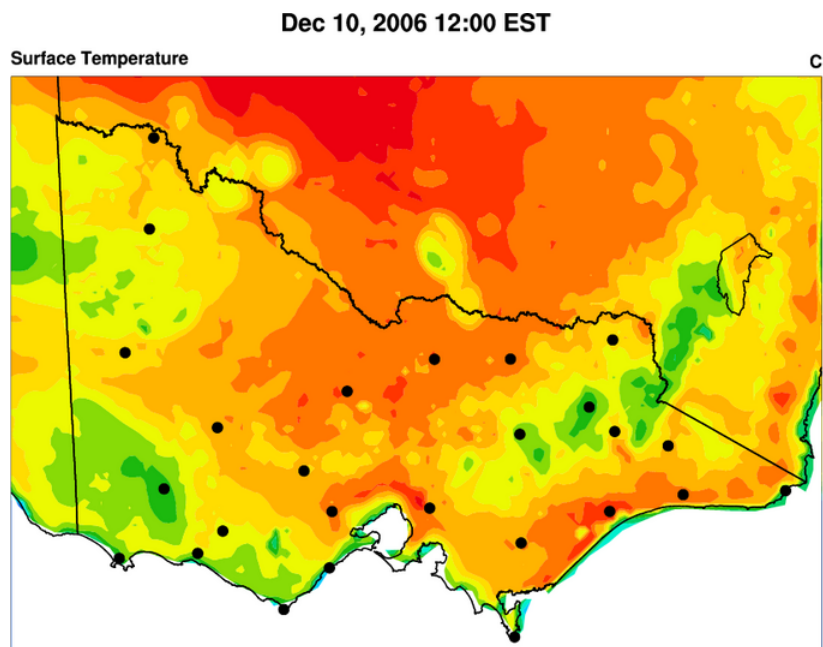
Dec 10, 2006 12:00 EST

Surface Temperature

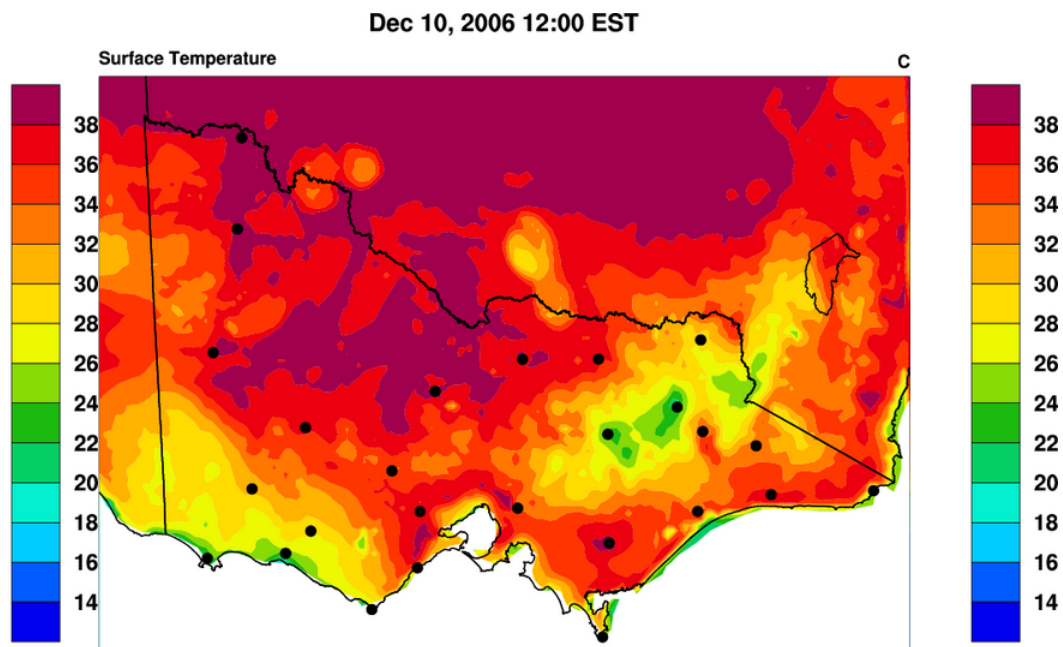
C



# Original



# Bias corrected

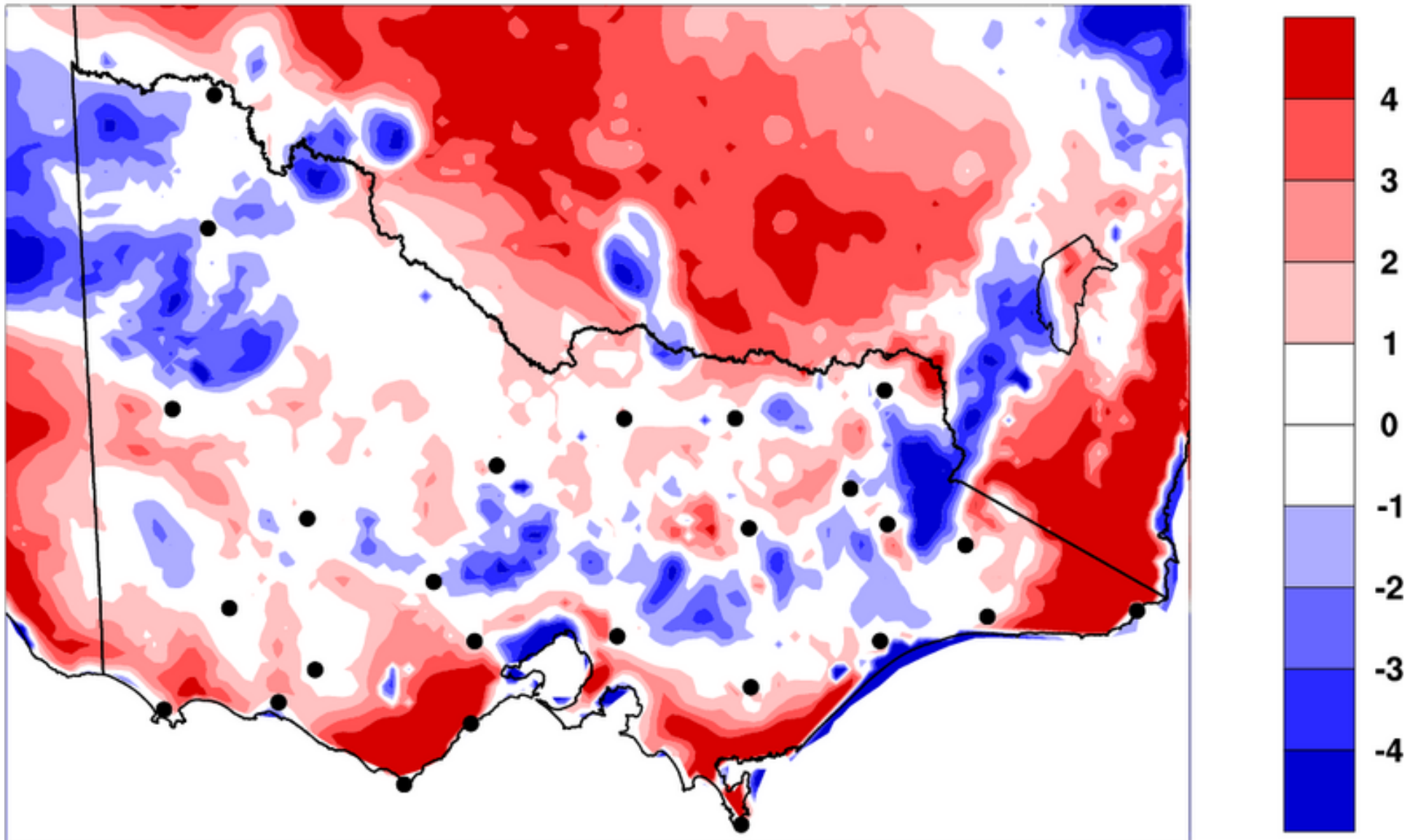


# Example case: Residual

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Surface Temperature

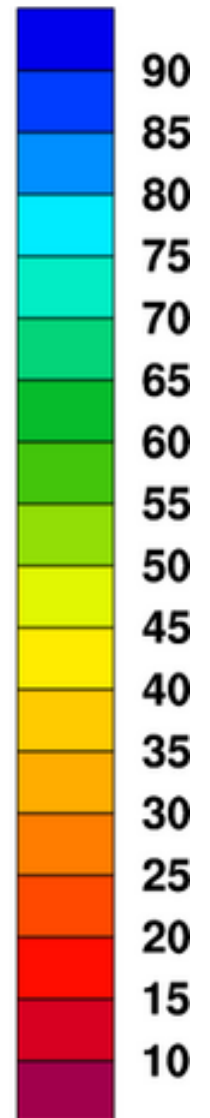
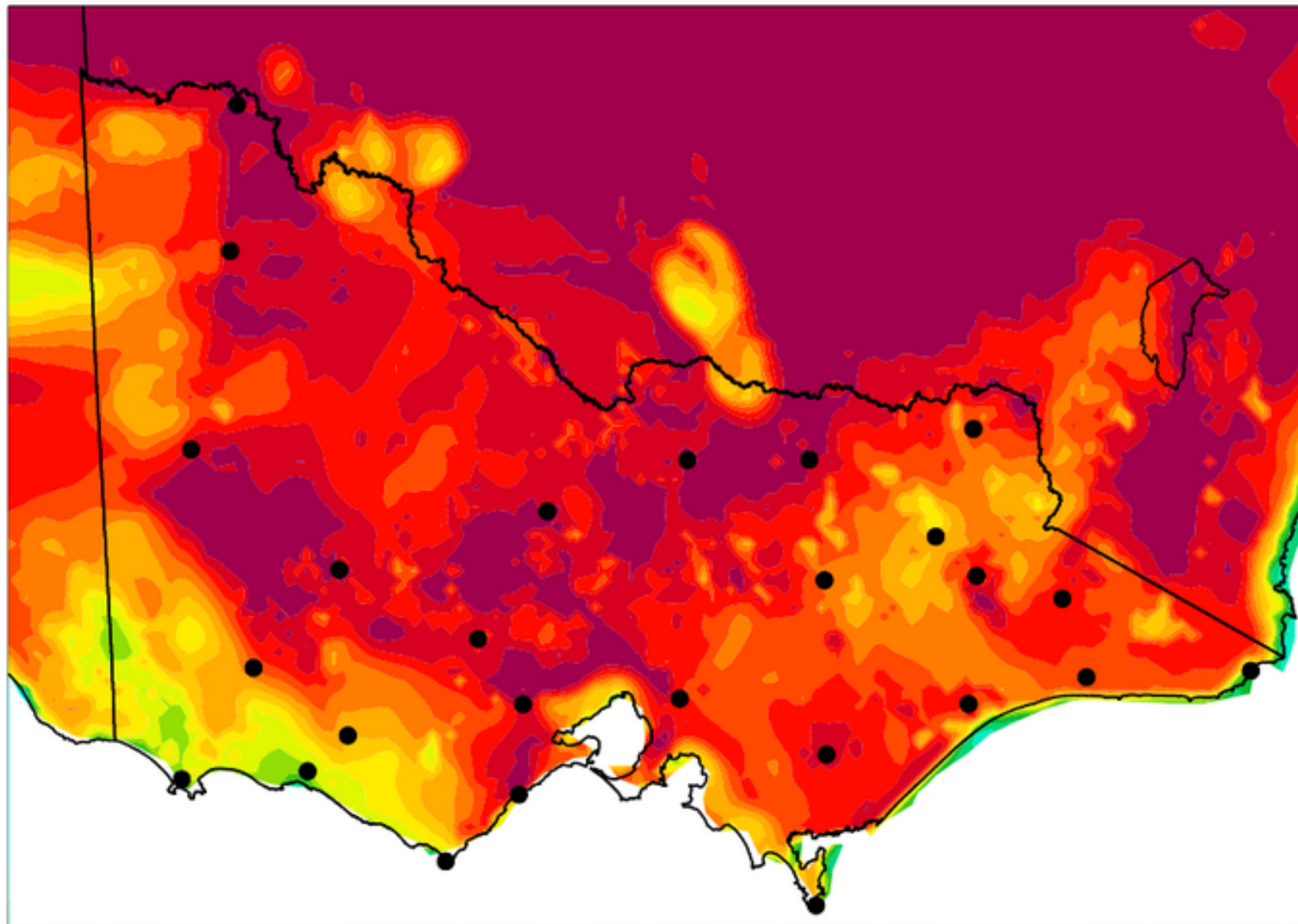
C



Dec 10, 2006 12:00 EST

Relative Humidity

%

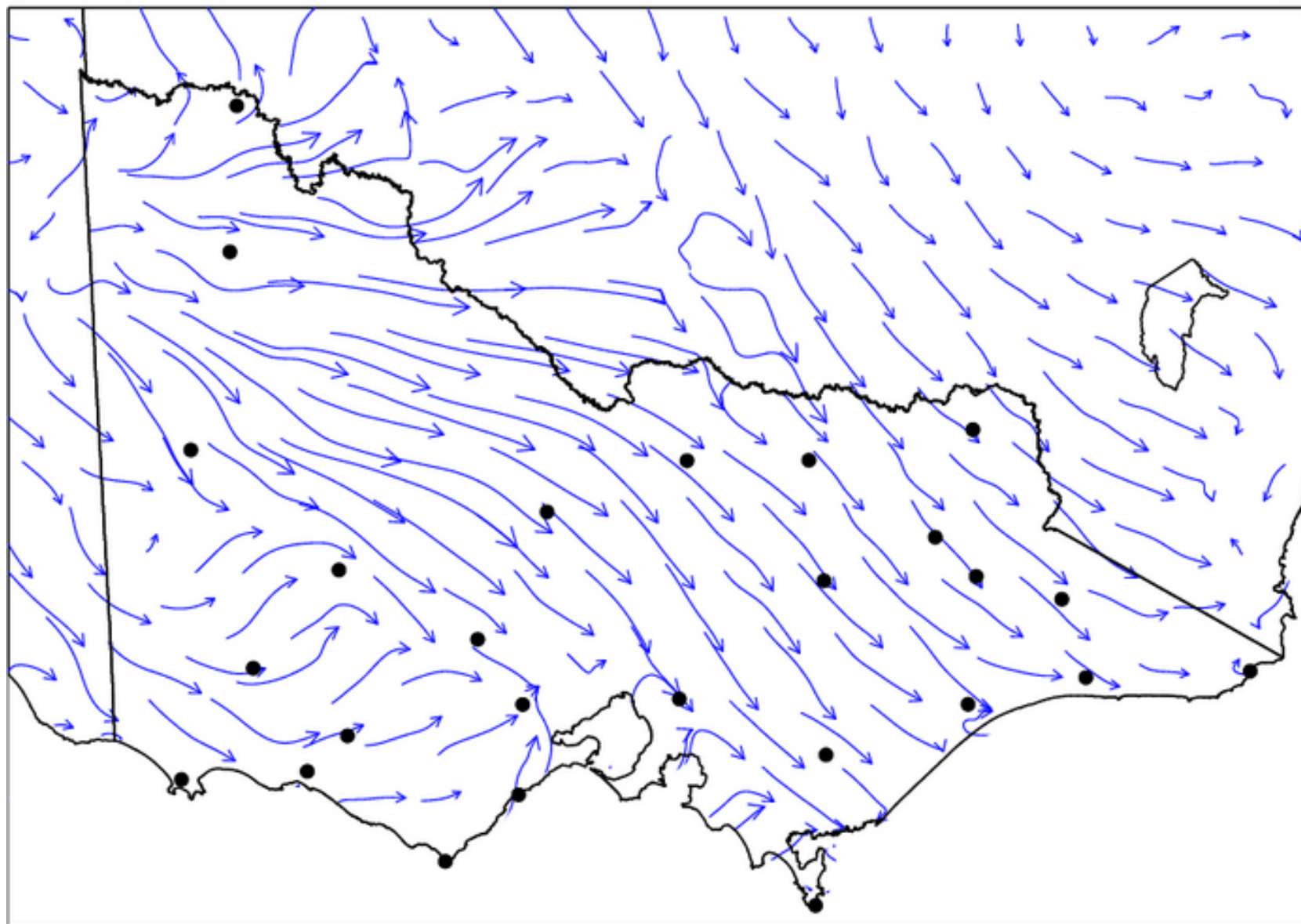




**Dec 10, 2006 12:00 EST**

**Surface Wind**

**Knots**

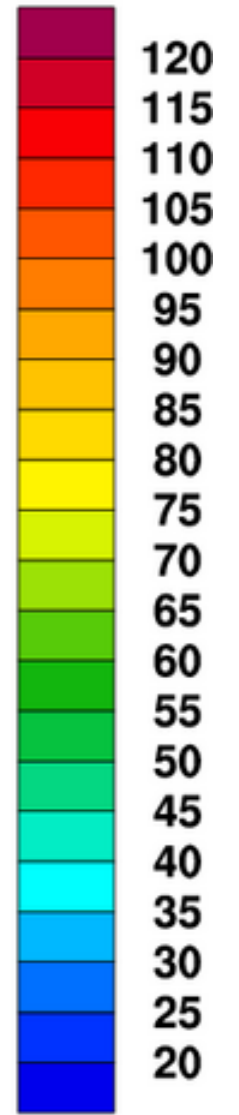
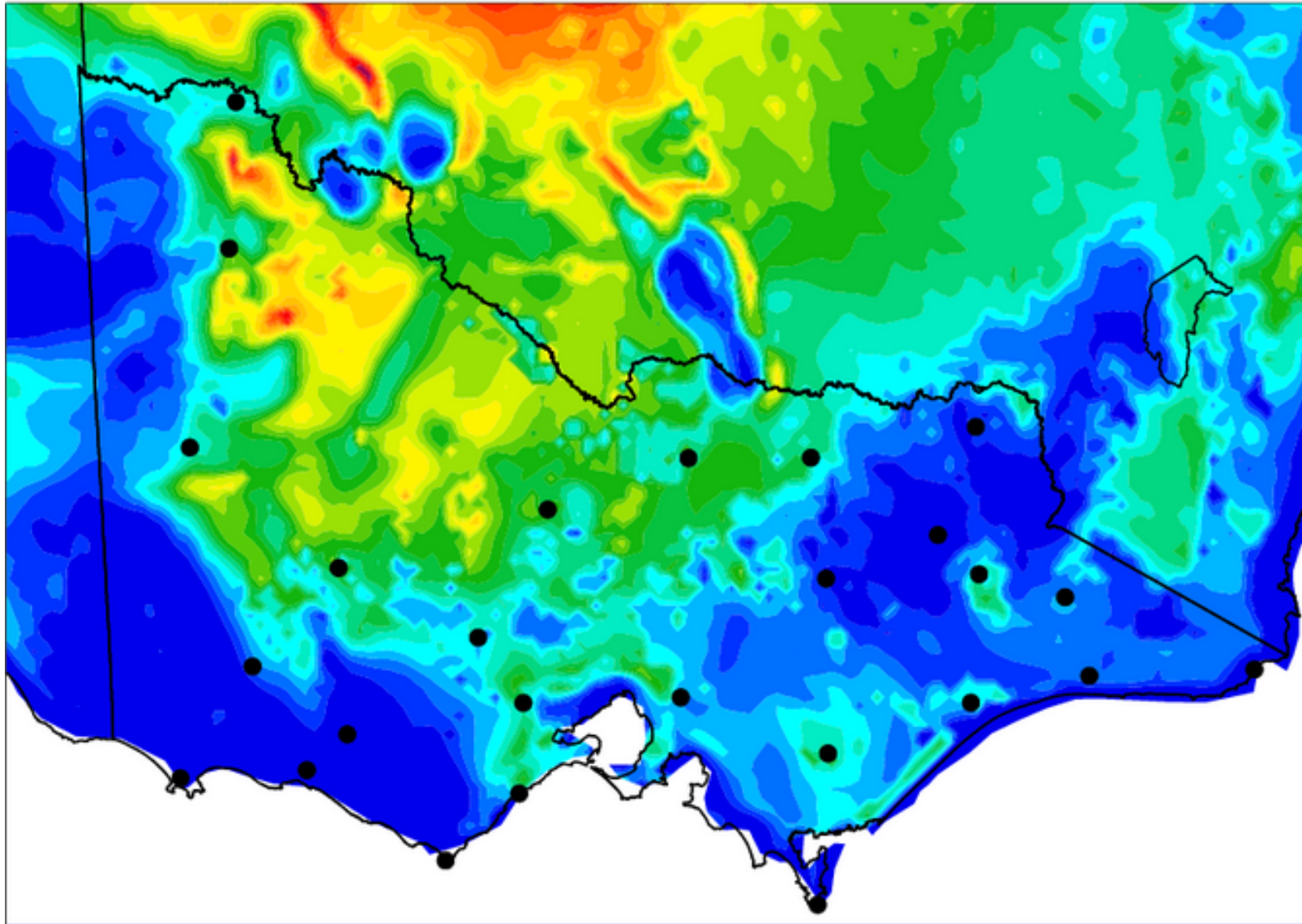


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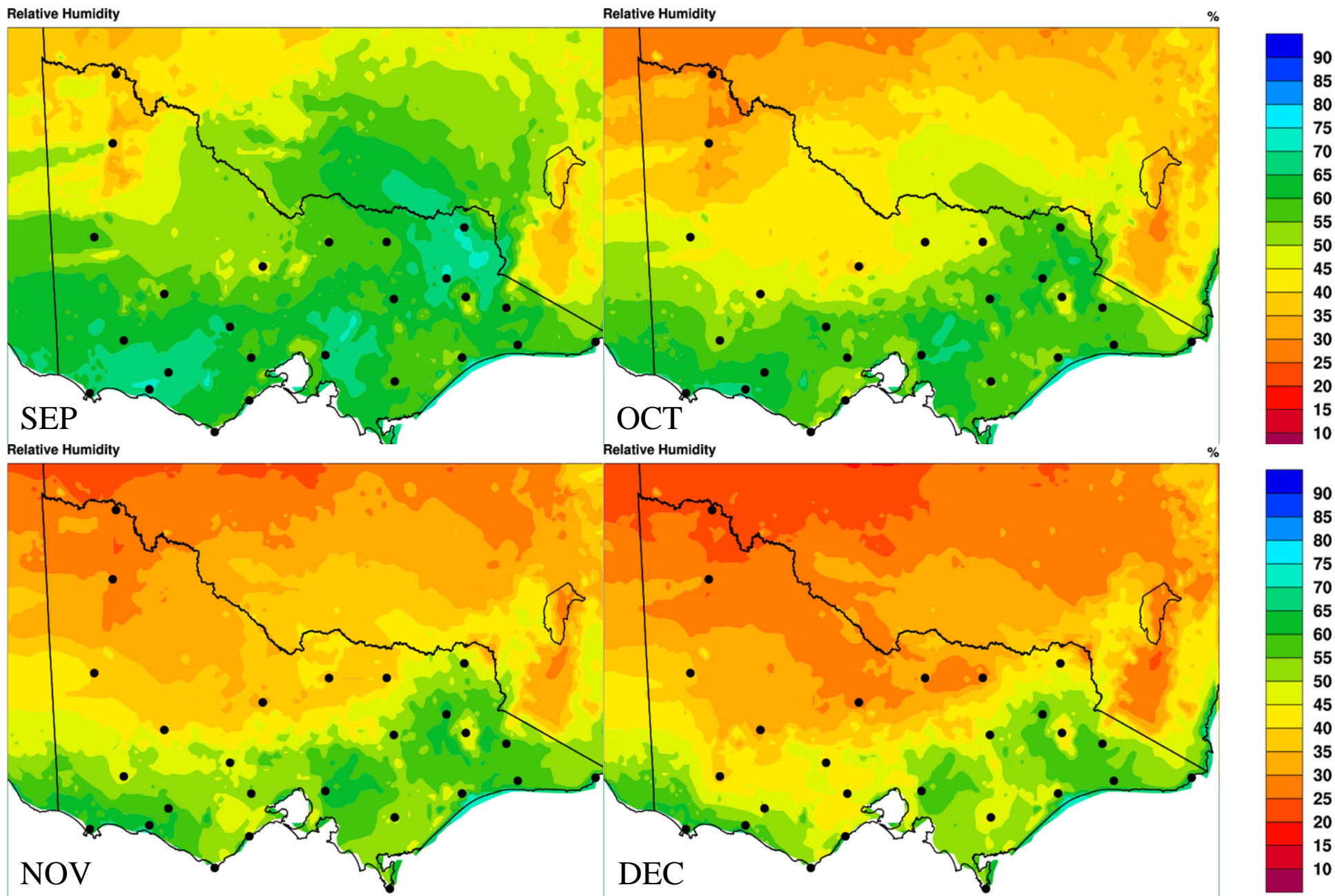


Dec 10, 2006 12:00 EST

FFDI



# Minimum relative humidity monthly climatology

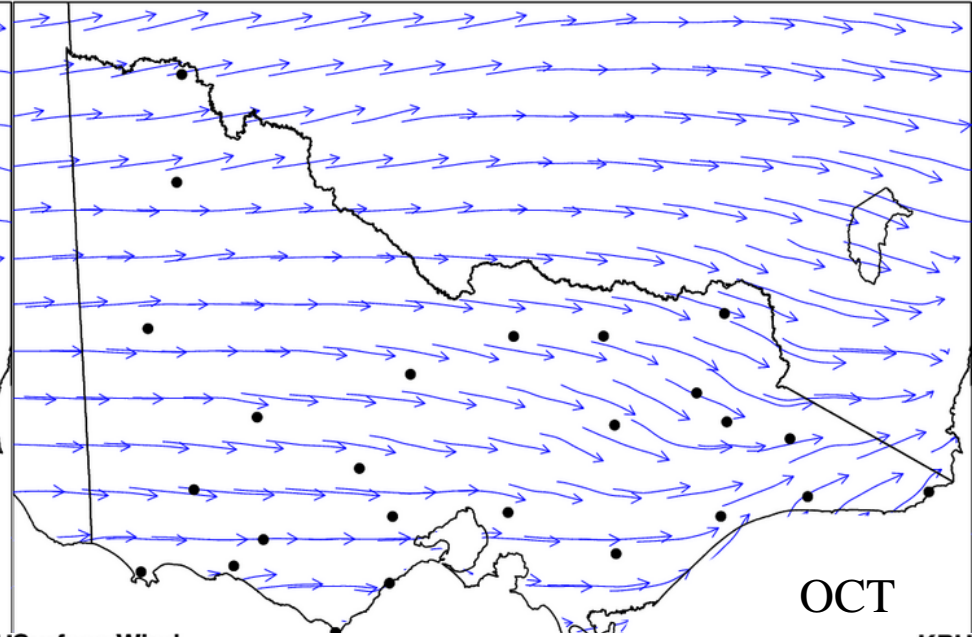
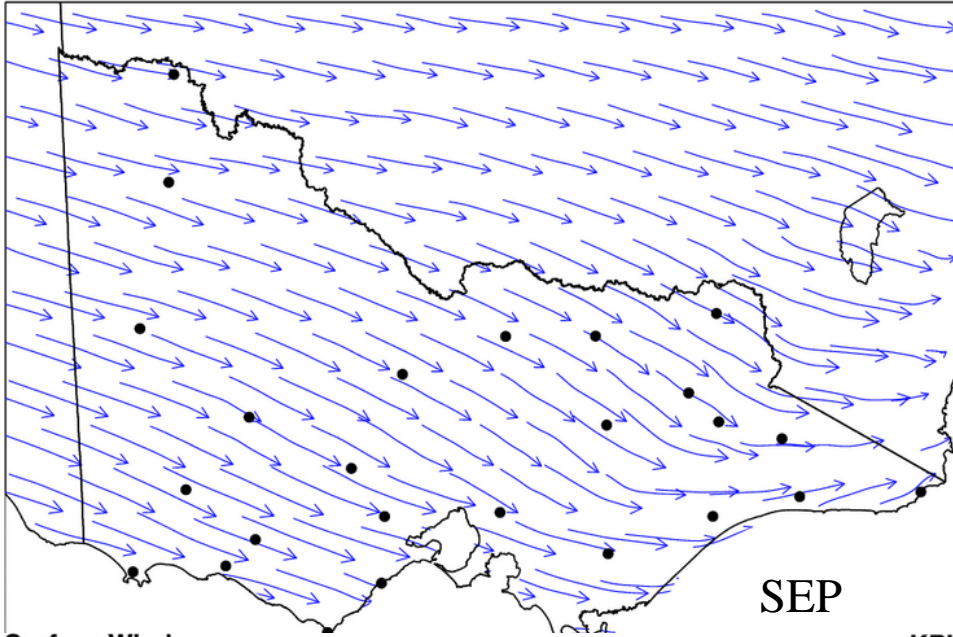




Surface Wind

KPHSurface Wind

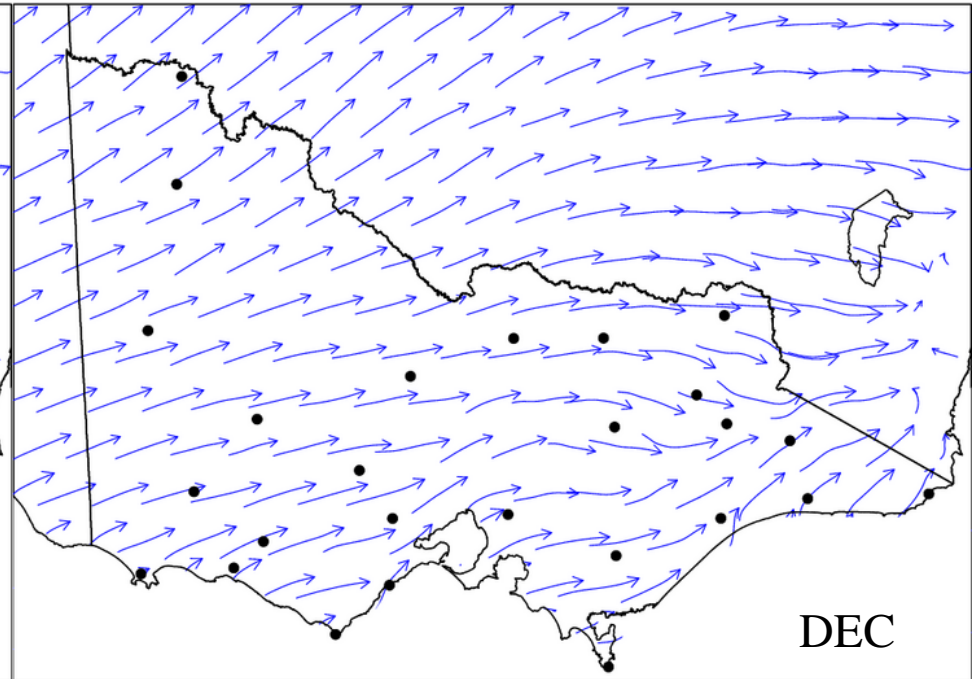
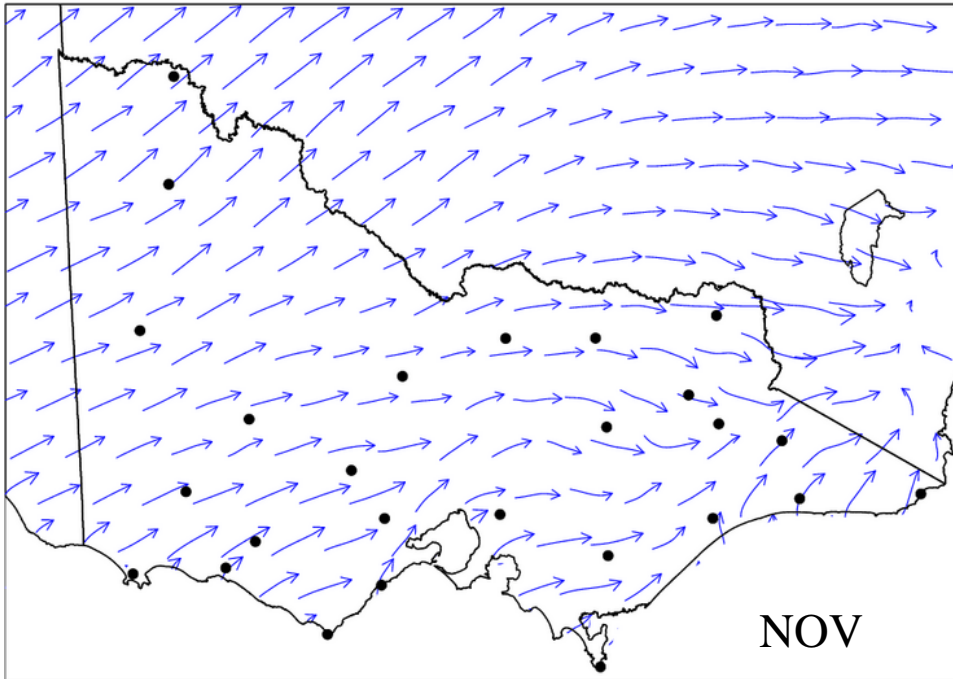
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Surface Wind

KPHSurface Wind

KPH





# Deliverables

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- Phase I (1997-2006)
- Phase II (1972-1996)
- Updates (2007; 2008)

The end.

