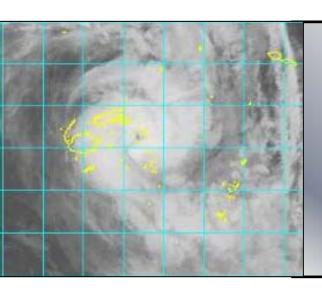


Greenhouse 2011 4-8 April 2011



Tropical cyclones and climate change in Australia

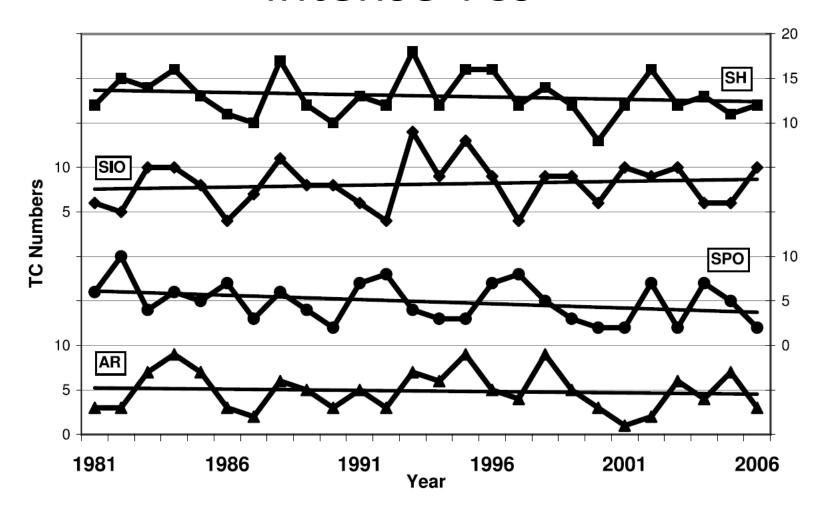
Kevin J. E. Walsh

School of Earth Sciences, University of Melbourne, VIC 3010, Australia

The bottom line

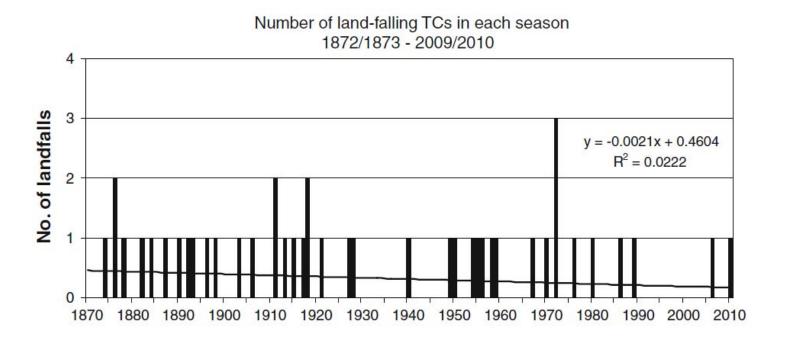
- Current trends show no significant increase in TC incidence in the Australian region as a whole
 - More likely a decrease in eastern Australia
- Clear majority of models now suggest some future decrease in numbers of TCs in the Australian region as a whole
 - It is still difficult to make precise predictions for a particular location
- High resolution models predict a slight but noticeable increase in the wind speeds in the most intense TCs

Current trends in TC incidence – intense TCs

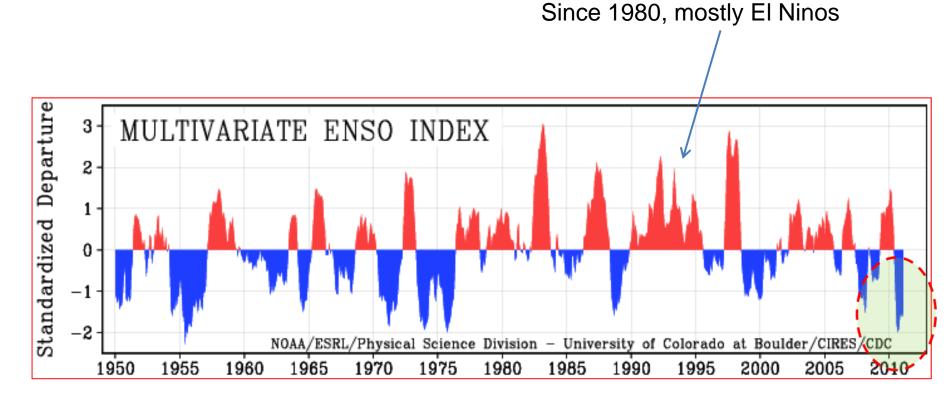


Kuleshov et al. (2010)

Long-term trend in landfall of severe TCs -- Queensland



Callaghan and Power (2010) Clim Dyn



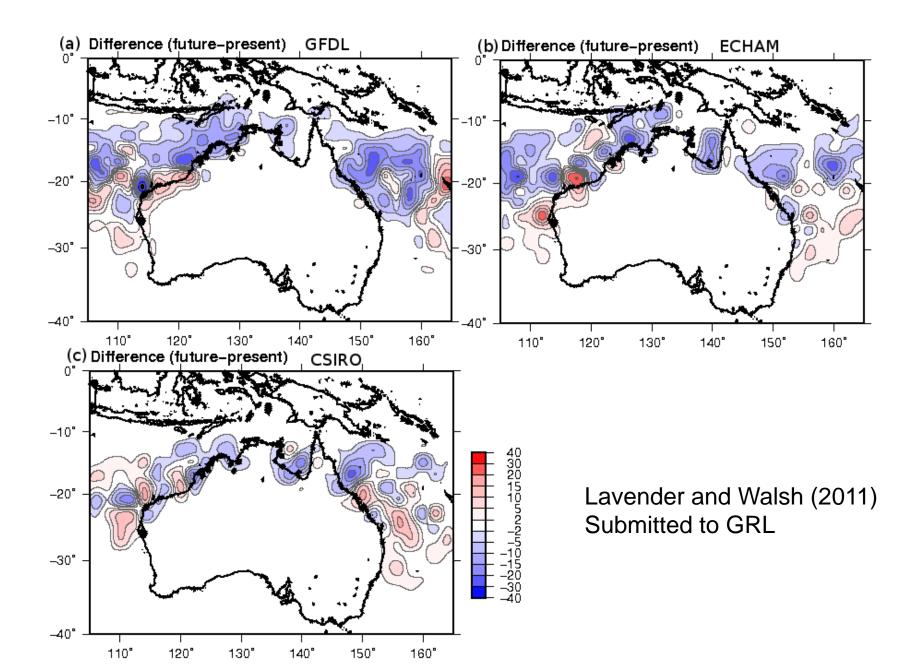
Above-average number of TC landfalls in Queensland this TC season so far (3 versus average of about 1)

21st century projections for Australia

- Projections using climate models
 - Resolution of such models usually inadequate to capture TC intensities well
 - Requires high-resolution techniques such as regional models that follow the cyclones around
 - Recent example: CSIRO
 Climate Adaptation
 Flagship project (talk later this afternoon)



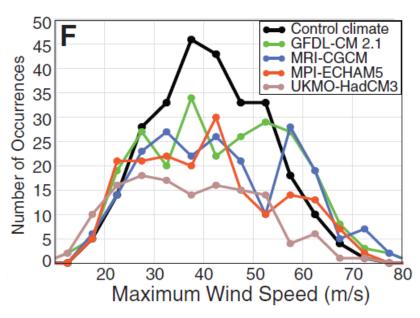
TC Yasi – 2 Feb 0335 UTC -- NASA



General conclusions from work in other TC basins

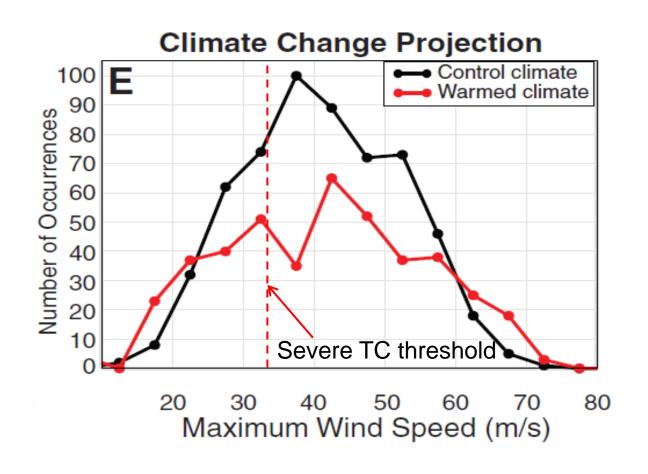
- The most intense TCs likely to become more intense (which may or may not imply a increase in frequency of severe TCs)
 - Haven't done this analysis yet in Lavender and Walsh (2011)
- Because of mean sea level rise, storm surge incidence is likely to increase even if TCs don't change

Atlantic TCs (late 21st cent.)



Bender et al. (2010) Science

Frequency of severe TCs versus maximum potential intensity



Future work

- Can we ever give precise predictions of changes in return periods of extreme wind speeds or surge by 2080 at a specific location?
 - No; even if we had perfect climate models, there will always be a range of predictions due to the range in estimates of future greenhouse gas amounts
 - Also, we don't have precise estimates of return periods in the current climate – a discussion point
- Does this mean these projections are useless?
 - No, but they need to be incorporated into a risk management framework, just like any current-climate return period estimate – another discussion point