

Thriving on Change

16th

**General
Insurance
Seminar**



9-12th Nov 2008
Hyatt Regency Coolum

Impact of Global Warming on Insured Flood Costs

**Presented by Tim Andrews on behalf of the
Flood Working Group**



Institute of Actuaries of Australia

16th
**General
Insurance
Seminar**



Thriving on Change

9-12th Nov 2008
Hyatt Regency Coolum

Roadmap

- Past trends in rainfall
- What the future might look like
- Impact on insured costs
 - The cost of flood now
 - How that might change
- Importance of ENSO



Institute of Actuaries of Australia

16th
**General
Insurance
Seminar**



Thriving on Change

9-12th Nov 2008
Hyatt Regency Coolum

Roadmap

- **Past trends in rainfall**
- What the future might look like
- Impact on insured costs
 - The cost of flood now
 - How that might change
- Importance of ENSO



Institute of Actuaries of Australia

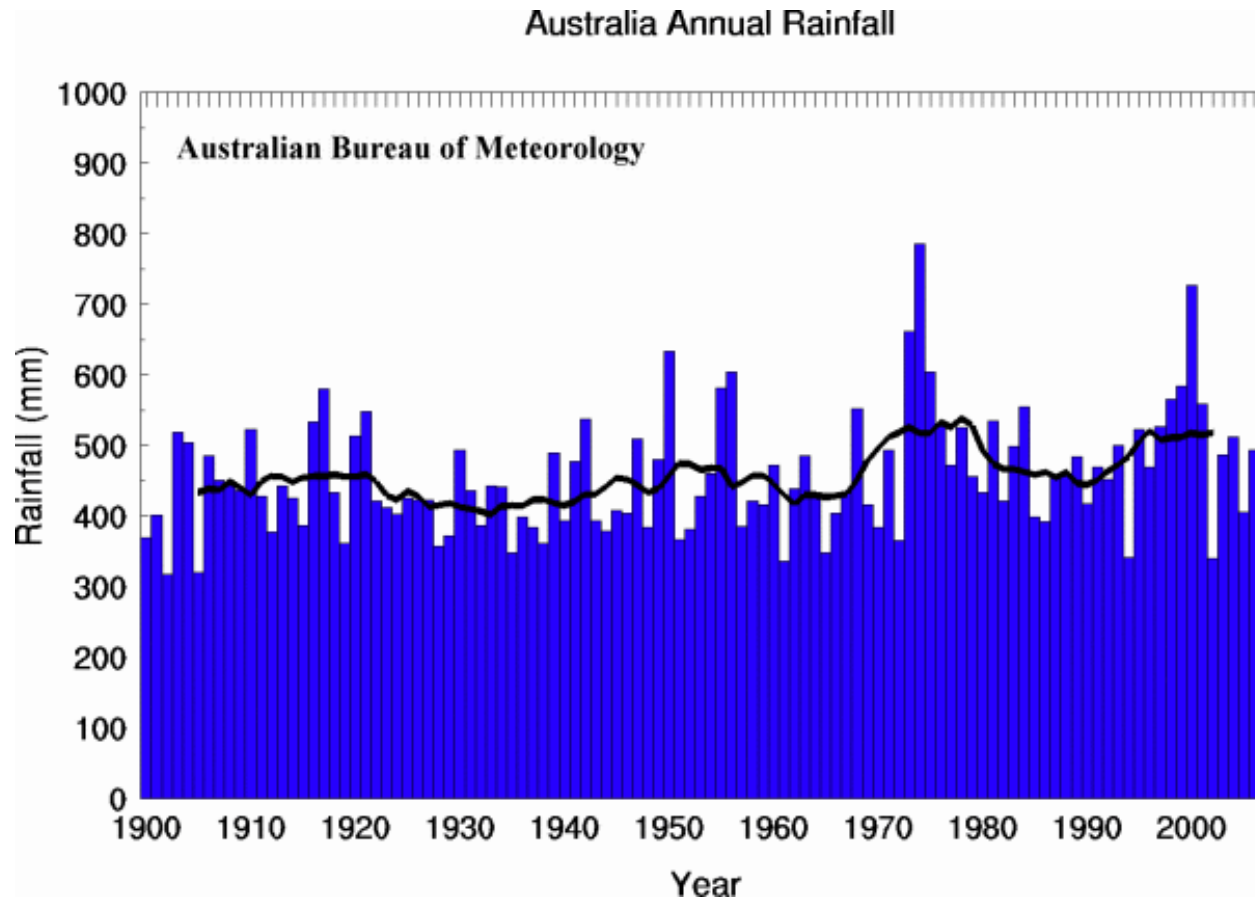
16th General Insurance Seminar



Thriving on Change

9-12th Nov 2008
Hyatt Regency Coolum

Rainfall Trend





Institute of Actuaries of Australia

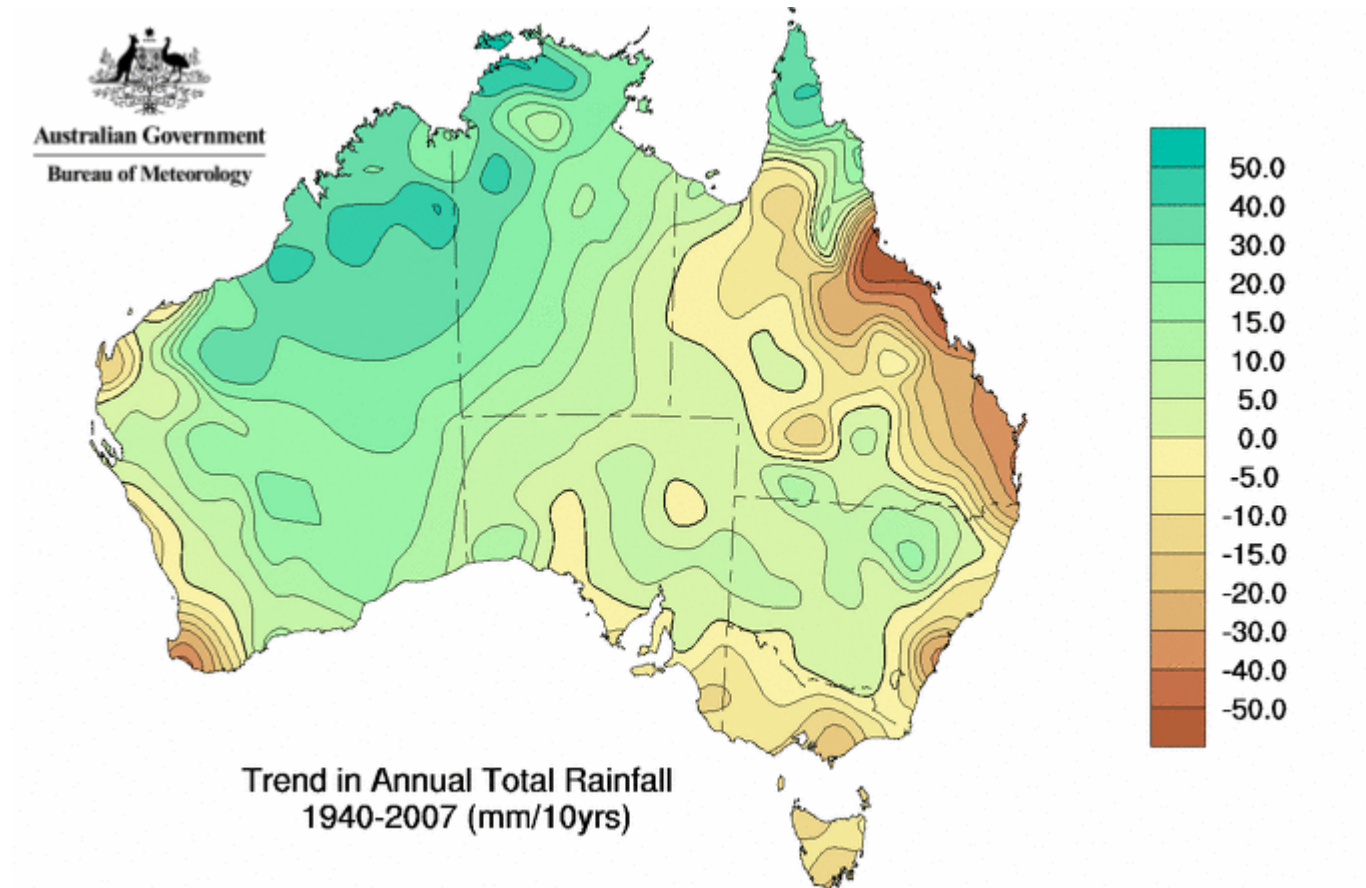
16th General Insurance Seminar



Thriving on Change

9-12th Nov 2008
Hyatt Regency Coolom

Rainfall 1940-2007





Institute of Actuaries of Australia

16th General Insurance Seminar

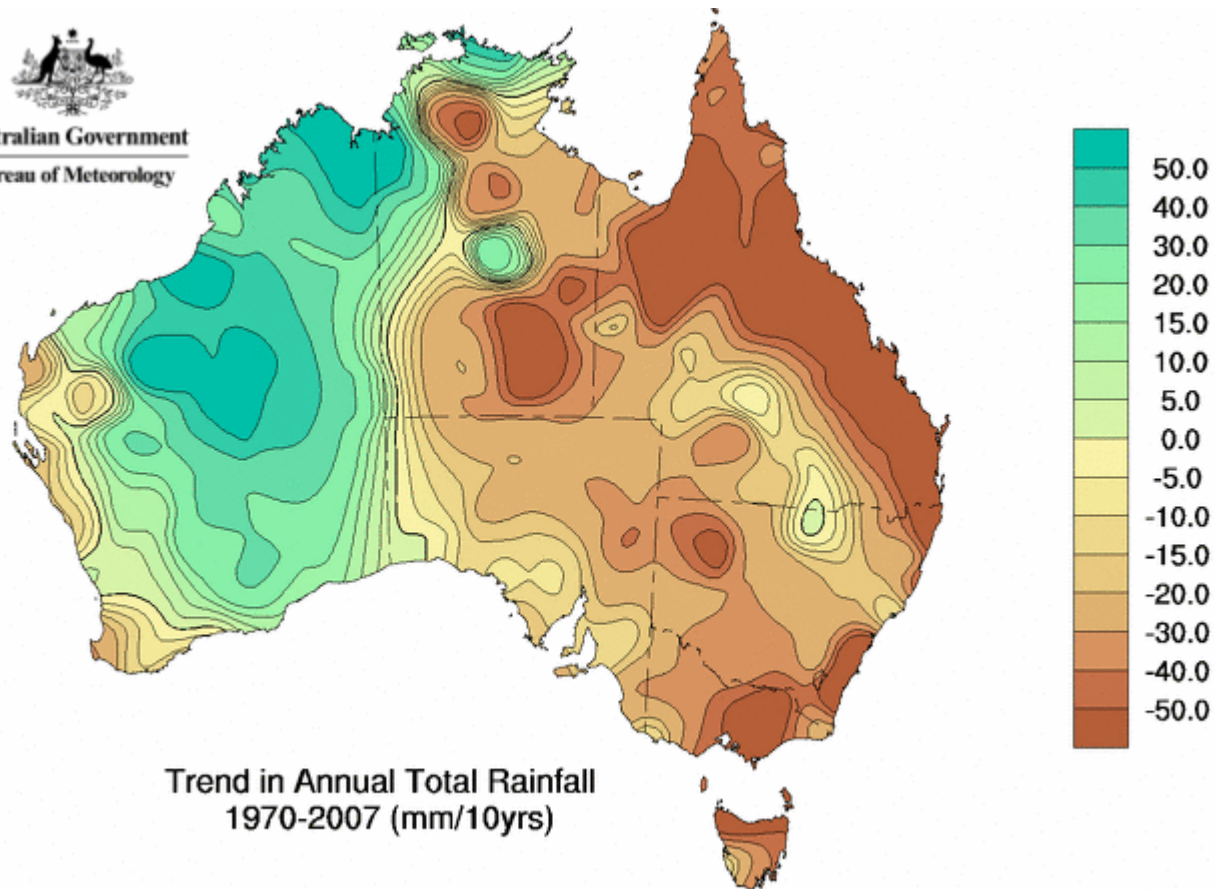


Thriving on Change

9-12th Nov 2008
Hyatt Regency Coolom

Rainfall 1970-2007


Australian Government
Bureau of Meteorology





Institute of Actuaries of Australia

16th
**General
Insurance
Seminar**



Thriving on Change

9-12th Nov 2008
Hyatt Regency Coolum

Roadmap

- Past trends in rainfall
- **What the future might look like**
- Impact on insured costs
 - The cost of flood now
 - How that might change
- Importance of ENSO



Institute of Actuaries of Australia

16th
**General
Insurance
Seminar**



Thriving on Change

9-12th Nov 2008
Hyatt Regency Coolom

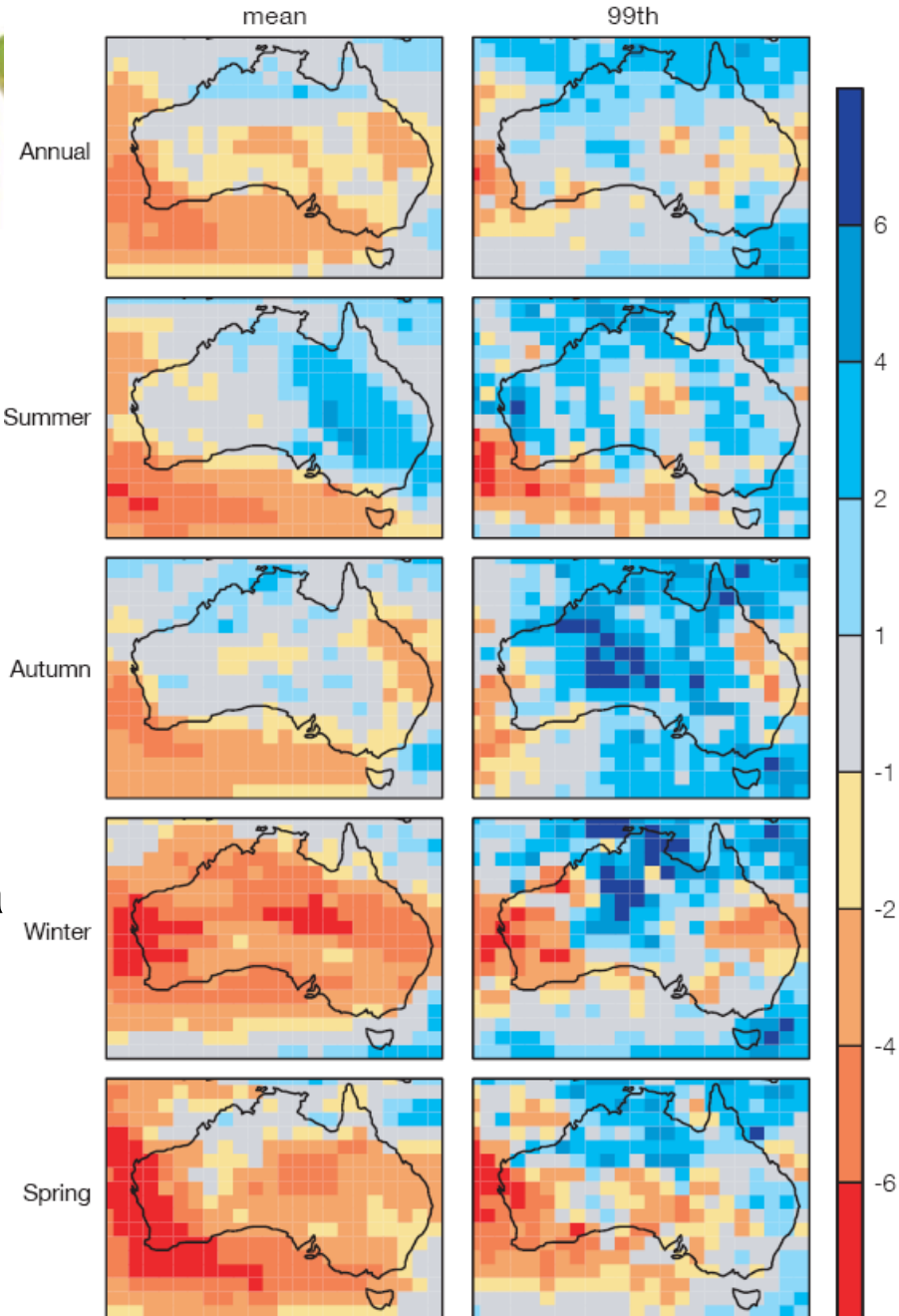
What the future might look like

- CSIRO-BOM Study, Climate Change in Australia, 2007
- Probably less rain in most populated areas
- Unlikely there will be increased rainfall anywhere in future
 - Eastern and Northern Australia 2070 range +10% to -20%
 - Southern Australia 2070 range 0% to -20%
- But intensity of rainfall expected to increase



Extreme precipitation

- An increase in daily precipitation intensity and number of dry days is likely
- Measured by amount of daily rainfall
- 99th percentile reflect most intense rainfall days
- These results show there may be a tendency for extreme precipitation to become more intense, except where mean precipitation declines substantially





Institute of Actuaries of Australia

16th
**General
Insurance
Seminar**



Thriving on Change

9-12th Nov 2008
Hyatt Regency Coolum

What the future might look like

- Storm surge will increase
 - higher average sea levels
 - if cyclones more intense, will exacerbate



Institute of Actuaries of Australia

16th
**General
Insurance
Seminar**



Thriving on Change

9-12th Nov 2008
Hyatt Regency Coolum

Roadmap

- Past trends in rainfall
- What the future might look like
- Impact on insured costs
 - The cost of flood now
 - How that might change
- Importance of ENSO



Institute of Actuaries of Australia

16th
**General
Insurance
Seminar**



Thriving on Change

9-12th Nov 2008
Hyatt Regency Coolum

Current costs paid by insurers

- Insurers may currently pay around \$150 million p.a. for catastrophic events called “flood”
- Likely there are also material levels of flood costs already paid by insurers but excluded from above
- We estimate addition of riverine flood coverage may add \$500 million of cost – but quite possibly some overlaps
- Whilst storm surge typically excluded by insurers, some claims paid out under past events



Institute of Actuaries of Australia

16th
**General
Insurance
Seminar**



Thriving on Change

9-12th Nov 2008
Hyatt Regency Coolum

Current costs paid by insurers

- Insurance claims linked to extreme conditions, rather than average
- Increase in intensity of rainfall more relevant than decrease in average
- Hence, flood costs likely to increase
 - And dry soils may exacerbate
- (Whatever) amounts are paid for storm surge will increase also
- What is the magnitude of the increase?
 - Closer to 1% p.a. than 5% p.a.



Institute of Actuaries of Australia

16th General Insurance Seminar



Thriving on Change

9-12th Nov 2008
Hyatt Regency Coolum

Current costs paid by insurers

- Insurance claims linked to extreme conditions, rather than average
- Increase in intensity or rainfall more relevant than decrease in average
- Hence, flood costs likely to increase
 - And dry soils may exacerbate
- (Whatever) amounts are paid for storm surge will increase also
- What is the magnitude of the increase?
 - Closer to 1% p.a. than 5% p.a.
- Reality check : but recent experience more variable than this?
 - Leads to consideration of natural variability



Institute of Actuaries of Australia

16th
**General
Insurance
Seminar**



Thriving on Change

9-12th Nov 2008
Hyatt Regency Coolum

Roadmap

- Past trends in rainfall
- What the future might look like
- Impact on insured costs
 - The cost of flood now
 - How that might change
- Importance of ENSO



Institute of Actuaries of Australia

16th General Insurance Seminar

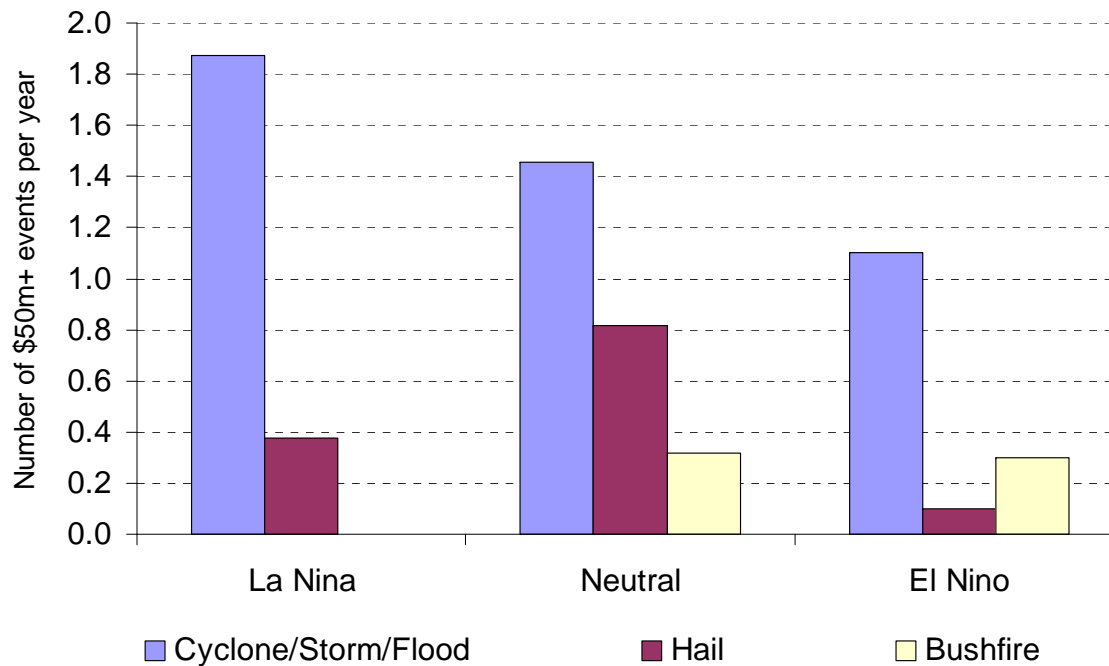


Thriving on Change

9-12th Nov 2008
Hyatt Regency Coolom

ENSO Effects

- Flooding is more likely than usual during La Niña years, and less likely in El Niño years, though heavy rain and flooding often accompany the breakdown of El Niño in late summer or autumn.





Institute of Actuaries of Australia

16th General Insurance Seminar

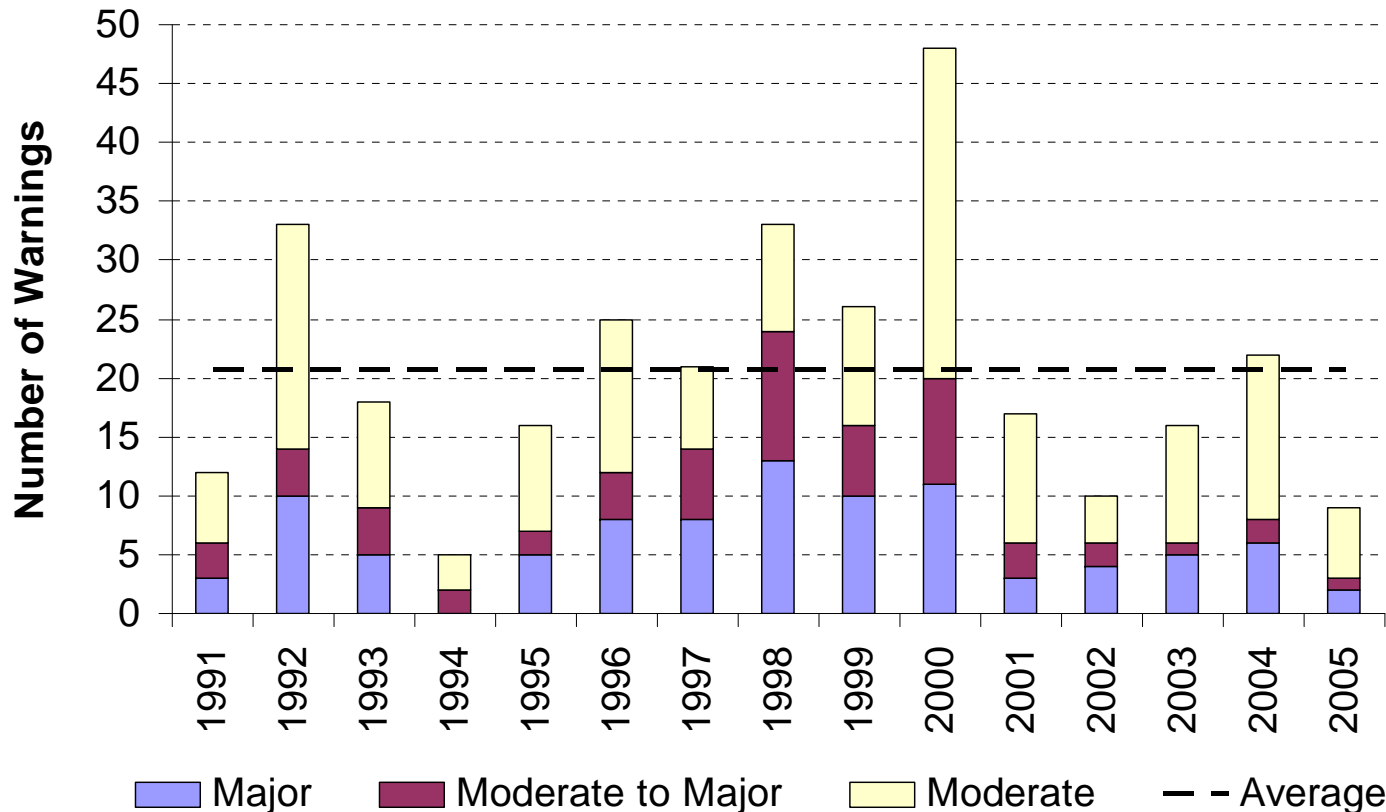


Thriving on Change

9-12th Nov 2008
Hyatt Regency Coolom

BOM Flood Warnings

- Worst years tend to be La Nina (1996, 1998, 1999, 2000)





Institute of Actuaries of Australia

16th
**General
Insurance
Seminar**



Thriving on Change

9-12th Nov 2008
Hyatt Regency Coolum

ENSO Summary

- ENSO has been and will continue to be main driver of variability that we experience in short to medium term
- Recent dominance of El Nino - at record levels
- A key future issue is whether El Nino will be more common
 - this is currently unknown
 - if yes, last 10 years the new “normal”?
- (IPCC 2007, CSIRO-BOM 2007) - ENSO will continue to operate and influence Australia, but no consensus on changes in amplitude or frequency