Climate Projections for Torres Strait and Southern PNG

Jack Katzfey, Wayne Rochester, Tim Skewes
The red bars show the global annual average near-surface temperature anomalies from 1850 on. The error bars show the 95% confidence intervals on the annual averages. The thick blue line shows the annual values after smoothing with a 21 point binomial filter. The dashed portion of the smoothed line indicates where it is influenced by the treatment of the end points. The thin blue lines show the 95% confidence intervals on the smoothed curve.
AIR TEMPERATURES CHANGES

- Increase of 0.8°C since 1880
- 0.15-0.2 °C per decade since 1975
AIR TEMPERATURES CHANGES

Trend in Annual Mean T

1960-2009 (°C/decade)
From Geophysical Research Letters
SEA LEVEL RISE

In situ data

Satellite data
SEA LEVEL RISE

Impact modelling in Torres Strait

PCCSP
OCEAN ACIDIFICATION

Graph showing the increase in atmospheric CO₂ and seawater pH over time.
OCEAN ACIDIFICATION
EMISSION SCENARIOS

- Observed
- Projected
- A1B
- A1FI
- A1T
- A2
- B1
- B2

Fossil Fuel Emission (GtC/y)


Impact modelling in Torres Strait

PCCSP
APPROACH
SURFACE TEMPERATURE (LAND & SEA)

1990

2055

2090

Warmer
ANNUAL MEAN RAINFALL

1990

2055

2090

Dryer
Calmer
SEA LEVEL RISE

- Current best guess - 1 m by 2100
SEA LEVEL RISE

- Island inundation mapping e.g. Boigu
ARAGONITE SATURATION COEFFICIENT

Maximum Annual Aragonite Saturation State – Papua New Guinea
CHANGE ACROSS TORRES STRAIT

<table>
<thead>
<tr>
<th>A2 scenario</th>
<th>2055</th>
<th>2090</th>
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</thead>
<tbody>
<tr>
<td>Temperature (°C)</td>
<td>+1.3</td>
<td>+2.5</td>
</tr>
<tr>
<td>Apparent temperature (°C)</td>
<td>+2.2</td>
<td>+4.8</td>
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<tr>
<td>Rainfall (%)</td>
<td>+3.4</td>
<td>-2.9</td>
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<tr>
<td>Relative humidity (% humidity)</td>
<td>+0.5</td>
<td>+0.6</td>
</tr>
<tr>
<td>Wind speed (%)</td>
<td>-2.2</td>
<td>-3.5</td>
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</tbody>
</table>
AVERAGE CHANGES IN TORRES STRAIT COMMUNITIES

• Rainfall change

<table>
<thead>
<tr>
<th>Rainfall % change</th>
<th>Badu</th>
<th>Boigu</th>
<th>Dauan</th>
<th>Erub</th>
<th>Hammond</th>
<th>Yam</th>
<th>Kubin</th>
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<tbody>
<tr>
<td>2055</td>
<td>+2.07</td>
<td>+5.31</td>
<td>+6.18</td>
<td>+5.13</td>
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<tr>
<td>2090</td>
<td>-6.98</td>
<td>+1.01</td>
<td>+1.07</td>
<td>+0.24</td>
<td>-9.42</td>
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<td>-6.98</td>
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<table>
<thead>
<tr>
<th>Mabuiag</th>
<th>Masig</th>
<th>Mer</th>
<th>Poruma</th>
<th>Saibai</th>
<th>St Paul</th>
<th>Ugar</th>
<th>Warraber</th>
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<tbody>
<tr>
<td>+3.23</td>
<td>+4.84</td>
<td>+3.07</td>
<td>+4.28</td>
<td>+6.31</td>
<td>+2.27</td>
<td>+6.10</td>
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<tr>
<td>-5.77</td>
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<td>-1.57</td>
<td>-2.44</td>
<td>+1.46</td>
<td>-6.53</td>
<td>+1.35</td>
<td>-4.19</td>
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</tbody>
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Downscaling future climate
Thank you