**UVI in New Zealand (also Australia & USA)**

Richard McKenzie  
NIWA, Lauder, Central Otago, New Zealand

UVI Index Meeting, Melbourne, 7 December, 2015

Highest Melanoma Rates in the world: Skin cancer costs NZ > $120 million per year.

- Martin Allen blames Horatio Nelson for trouncing the Spanish fleet the Battle of Trafalgar, 1805 (score: 22 to nil)
- But no new melanoma drug (keytruda) for Kiwis!

Skin types are not well adapted to latitude

Peak UV at 45°S (Lauder, NZ) compared with sites in North America of comparable latitude. The sites selected, which are a subset of the USDA UV network sites maintained by the University of Colorado, are shown on the map.
Maximum UVI by Location

UVI > 25 at Cusco in the altiplano Peruvian Andes
[Compare NZ =13 with UK = 7 and Antarctica, 17]

Melanoma Deaths v Road Kill

• 2012 - 2,324 new melanoma cases, 354 deaths (222 male and 132 female)
• 2012 – 12,122 road injuries, 308 deaths


Regional UVI Measurement Sites

Seasonal range of peak UVI in New Zealand
(averaged over 1 hour at solar noon)

<table>
<thead>
<tr>
<th>Location</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auckland</td>
<td>13</td>
<td>11</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>5</td>
<td>6</td>
<td>8</td>
<td>11</td>
<td>12</td>
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<tr>
<td>Wellington</td>
<td>13</td>
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<td>7</td>
<td>4</td>
<td>3</td>
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<td>11</td>
<td>12</td>
<td>12</td>
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<tr>
<td>Christchurch</td>
<td>12</td>
<td>9</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>8</td>
<td>11</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Central Otago</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>2</td>
<td>1</td>
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<td>4</td>
<td>7</td>
<td>10</td>
<td>11</td>
<td>11</td>
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<tr>
<td>Invercargill</td>
<td>8</td>
<td>7</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>5</td>
<td>9</td>
<td>10</td>
<td>10</td>
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</tbody>
</table>

[should extend the table to include Australian sites]

www.niwa.co.nz/our-services/online-services/uv-ozone
Where to find UVI data

- NIWA web site
  - https://www.niwa.co.nz/our-services/online-services/uv-ozone
- ARPANSA web site
- BoM web site
- Phone apps
  - SunSmart app (Australia only)
  - uv2Day app (Australia, NZ, Pacific, Antarctic)
  - GlobalUV (under development)
- Media
  - Summer only
  - Clear sky only
  - In NZ gives only the UV Alert Period (Times when UVI >3)
- Sunsmart Schools: http://www.sunsmartschools.co.nz
- UVLens (Kindergarten) UVI Displays, apps, meters http://www.uvlens.com/

Note that there are discrepancies between these. For example, ARPANSA’s UVI values are about 10% lower than NIWA’s, or BoM’s.

uv2Day:
An App For Daily UV Index Forecasts

Richard McKenzie, Jeremy Burke, Richard Turner, & Ben Liley
NIWA, Lauder, Central Otago, New Zealand
UV & Skin Cancer Prevention, Melbourne, Wednesday 9 December, 2015

Now includes notification! Android only, but soon available on iphone

UVI in NZ: Changes have been small
Big Variability in UVI
Australia & USA

**UVI: Spectral Measurements Summary**

<table>
<thead>
<tr>
<th>Location</th>
<th>Year Start</th>
<th>Year End</th>
<th>Number of Scans</th>
<th>SZA min</th>
<th>SZA max</th>
<th>UVI max</th>
<th>UVI&gt;3 (%)</th>
<th>UVI&gt;10 (%)</th>
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</thead>
<tbody>
<tr>
<td>New Zealand</td>
<td>1994</td>
<td>2006</td>
<td>106,826</td>
<td>21.6</td>
<td>220</td>
<td>0.74</td>
<td>77</td>
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<td>2006</td>
<td>2015.5</td>
<td>90,818</td>
<td>21.6</td>
<td>225</td>
<td>0.74</td>
<td>76</td>
<td>95</td>
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<tr>
<td>Australia</td>
<td>2009.4</td>
<td>2015.4</td>
<td>53,418</td>
<td>14.3</td>
<td>236</td>
<td>0.67</td>
<td>77</td>
<td>99</td>
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<tr>
<td>Australia</td>
<td>2006.5</td>
<td>2015.3</td>
<td>57,754</td>
<td>0.5</td>
<td>219</td>
<td>0.82</td>
<td>83</td>
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<td>2006.0</td>
<td>26,941</td>
<td>0.1</td>
<td>229</td>
<td>0.77</td>
<td>78</td>
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<tr>
<td>USA</td>
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<td>2015.2</td>
<td>212,302</td>
<td>0.3</td>
<td>215</td>
<td>0.88</td>
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<td>100</td>
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<td>2015.6</td>
<td>164,833</td>
<td>16.6</td>
<td>221</td>
<td>0.73</td>
<td>67</td>
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<tr>
<td>USA</td>
<td>1997.9</td>
<td>2015.2</td>
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**Broad Band Measurements**

http://www.stats.govt.nz/browse_for_stats/environment/

New Zealand's UV levels are high, often exceeding a UV index of 11 (the threshold that indicates extreme UV levels) on summer days.

- In winter, daytime UV indexes are often below 1 – even on clear days, the UV index can still be as low as 1.
- Between 1981 and 2014, in the five locations monitored by NIWA, the average number of days per year that the daily peak UV index exceeded 11 were:
  - Invercargill: 3.0 days (highest was 12.7 in December 1998)
  - Lauder (Otago region): 29 days (highest was 14.3 in Jan 1996 and Dec 2005)
  - Christchurch: 16 days (highest was 14.1 in January 2011)
  - Paraparaumu (Wellington region): 44 days (highest was 14.6 in Feb 2009)
  - Leigh (Auckland region): 63 days (highest value was 16.8 in Nov 2001).
- UV showed no consistent trend across monitoring sites.
Broad Band Measurements
http://www.stats.govt.nz/browse_for_stats/environment/

Thank you ....