



PART C

References and Further Resources

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C1 - Books and Publications

General

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Szokolay, S.V. and Sale, R.W., *The Australia and New Zealand Solar Home Book: A Practical Guide*, Australia and New Zealand Book Co., Sydney 1979

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Victorian Department of Conservation and Natural Resources, *Home Greenhouse Saver*, 3rd Edition, Melbourne 1993

Landscape

Archer, J., Hodges, J. and Lehunt, B., *The Water Efficient Garden*, Random House, Australia 1993

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Mattingly and Peters, 'Wind and trees: Air infiltration effects on energy in housing', *Journal of Industrial Aerodynamics*, Vol.2, 1977

Lochhead, H., *Gardens for Living*, Greenhouse Publications, 1987

Robinette, G.O. (ed.), *Landscape Planning for Energy Consumption*, New York 1983

C2 - Contact List

Environment Australia Community Information Unit
GPO Box 787
Canberra ACT 2601
tel: 1800 803 772
www.erin.gov.au/net/environet.html

Environment Australia manages Commonwealth programs and implements environmental policies. The Department can provide information and advice on issues relating to energy and water use, and waste minimisation and management.

New South Wales Environment Protection Authority Pollution Line
PO Box 1135
Chatswood NSW 2057
tel: 131 555
www.epa.nsw.gov.au

The NSW EPE can provide information, brochures and advice on how to take practical actions to conserve energy and water and minimise waste. Most publications are free of charge, with a list available on the website.

Standards Australia
PO Box 1055
Strathfield NSW 2135
tel: 1300 654 646
fax: 1300 654 949
www.standards.com.au

Standards Australia is the national organisation that sets standards on a wide range of environmental management issues, including energy management, energy-efficient appliances, water management and water conservation devices. Check the website for a catalogue of all standards.

Australian Wood Heating Association
1st Floor, 7 south Road
Brighton Vic 3186
tel: 03 95922522
fax: 03 9592 8080
www.homeheat.com.au

The association is an industry body that can provide consumers with advice on manufacturers and suppliers of solid fuel and wood heaters nationally.

Department of Primary Industries and Energy
GPO Box 858
Canberra ACT 2601
tel: 02 6272 3933
fax: 02 6272 5161
www.dpie.gov.au

The Department focuses on programs which promote innovative energy supply by increasing the use of new efficient renewable and non-renewable energy technologies. A comprehensive range of energy management brochures and information sheets is available.

Solar Energy Industries Association of Australia
1st Floor, 505 St Kilda Road
Melbourne Vic 3004
tel: 03 9866 8977
fax: 03 9866 8922

The association produces a range of brochures and publications on the use and installation of alternative energy sources, including solar and wind power.

NSW Sustainable Energy Development Authority (SEDA)
PO Box N442
Grosvenor Place Sydney NSW 1220
tel: 02 9291 5260
fax: 02 9299 1519
www.seda.nsw.gov.au

SEDA provides assistance and advice for the development of sustainable energy systems. It also runs programs aimed at promoting energy efficiency and has a range of brochures that can be provided in hard copy or found on the website. The Energy Smart Allies Directory provides a comprehensive list of organisations that can provide energy efficient products and services.

Water Services Association of Australia
Level 7, 469 Latrobe Street
Melbourne Vic 3000
tel: 03 9606 0678
fax: 03 9696 0376
www.wsaa.asn.au

The association manages the national Water Conservation Appliance Rating and Labelling Scheme (AAA) which has been designed to provide consumers with a means of identifying water-efficient appliances and to encourage manufacturers to continue to improve the water efficiency of their products.

Rous Water
PO Box 230
Lismore NSW 2480
tel: 1300 132 446
fax: 02 6622 1181
water@rousc.nsw.gov.au
www.perradenya.com.au

For information on water supply options,
incentives and assistance for your new house
at Perradenya.

Reliance Manufacturing Company
40-42 Ross Street
Newstead Qld 4006
tel: 1800 810 803
fax: 1800 062 669

RMC manufacture and supply several flow
control devices, including the EcoValve flow
control valve.

Ryemetal Forgings Pty Ltd
181-183 Dandenong-Frankfurt Road
Dandenong Vic 3175

Planet Ark
160-162 Devonshire Street
Sydney NSW 2010
tel: 02 9319 5288
fax: 02 9319 7199
admin@planet.ark.com.au
www.planet.ark.com.au

Planet Ark is a non-government organisation
that can provide information and advice on how
to develop a long term, cost-effective strategy.
It has a number of offices and shops
throughout Australia. Contact the head office
for information on the nearest office or shop.

C3 - Websites

The following list of website addresses is by no means comprehensive. It is intended as a starting point for access to a very wide range of information available on the Internet. Most sites have links to numerous others.

www.perradenya.com.au

www.rpc.com.au

www.seia.com.au/links/index.htm

www.seia.com.au/association/brochureDL.html

www.fbe.unsw.edu.au/units/solarch/hmb

www.fbe.unsw.edu.au/units/solarch/sustaininfo.htm

www.fbe.unsw.edu.au/units/solarch%20publications.htm

www.users.bigpond.com/ges/

www.energysmartallies.com/tips.html

www.cat.org.uk/information/sustain.tmpl

www.cat.org.uk/shopping/newfutures.tmpl

www.bwea.com

www.seda.nsw.gov.au

www.pv.unsw.edu.au/solpages.html

www.seda.nsw.gov.au/new_pvsystem_body.asp

www.seda.nsw.gov.au/new_wind_body.asp

www.seda.nsw.gov.au/new_cashbackoffer_body.asp

Appendix CI



Wind Frequency Analyses and Wind Roses

The included set of wind frequency analysis tables and/or wind roses show the frequency with which winds of various strengths are observed coming from various directions. These notes should help you to use the information.

Data

Wind speed and direction are measured by a number of means. In some cases, they are only estimated. To find out exactly which method has been used, a search of the appropriate station history file would be required.

The data are collected by the National Climate Centre in the Bureau of Meteorology's Melbourne head office. They are stored in ADAM (the Australian Data Archive for Meteorology), an extensive computer database of meteorological observations.

As the observations are stored, basic checks are performed. Any observations that fail these tests (specifically, any whose quality flag is poorer than "4 - estimated, medium certainty") are excluded from the frequency analyses that follow.

Analysis

The data are collated in a number of ways, depending on the nature of your request.

To group by hour, the observations are assigned to the closest standard three-hour reporting time. For example, all observations between 7:30 am and 10:30 am local standard time are labelled "9 am".

If a seasonal grouping has been requested, then "autumn" is March, April and May, "winter" is June, July and August, "spring" is September, October and November, and "summer" is December, January and February.

The observations are then grouped by speed. The exact number of speed ranges and their size depends on your request. When the speed ranges are labelled, "1 - 10" is used for all speeds greater than 0 but less than or equal to 10. "11 - 20" means greater than 10 but less than or equal to 20.

The data are then grouped by direction; into 8 or 16 bins as requested. When doing this, observations that fall on a bin boundary are split equally between the two bins. For example, when grouping into 8 bins, a direction of "NE" covers all observations with directions strictly between NNE and ENE; "E" covers from ENE to ESE. If the direction is exactly ENE (67.5°), then it will be placed half in the "NE" bin and half in "E" one.

Tables

If you have requested wind frequency tables, then you will get a separate table for each time group. Each table shows the time to which it applies, and the total number of observations used at that time. The percentage frequency with which calm conditions (that is, no wind) are observed are displayed at the top left of the table.

The rest of the table is laid out with directions across and speeds down. To find the frequency with which winds of a given speed and direction occur, follow down the appropriate direction column and across the speed row until they intersect. The value printed there is the frequency you require. For example, a value of "14" indicates that this speed/direction group occur about 14% of the time. "*" indicates the range has occurred but less than 0.5% of the time.

The last column, labelled "All", gives the frequency of each speed range regardless of direction. Similarly, the last row gives the frequency of each direction, regardless of speed.

Roses

Wind Roses seek to make the data in a wind frequency table easier to digest. Although not ideal for quantitative work, they are good for providing a quick visual impression of the wind regime.

Like the tables, there is one wind rose for each time group that you requested. Each rose consist of a central circle, surrounded by branches, each made up of a number of petals.

The circle represents the frequency of calm conditions. The size of the circle is proportional to the number of calms; a scale is given in the legend at the top of the page.

Each branch represents the wind coming from that direction. North is to the top, and the other directions are shown in the legend. In each case, the wind is blowing from that direction toward the calms circle. Each petal corresponds to a speed range from that direction. The length of the petal is proportional to the frequency of that wind; the scale is shown in the legend. The thickness of the petal is used to indicated which speed range it represents.

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More Information

Prepared by the Coff's Harbour Office of the Bureau of Meteorology

Contact us by phone on (02) 6652 3485 or by fax on (02) 6652 5240

Appendix CI (cont'd)

Wind Frequency analysis using available data between 1957 and 2000 for LISMORE (CENTRE STREET)

Site Number 058037 • Locality: LISMORE • Opened Jan 1884 • Still Open • Latitude 28°48'33"S • Longitude 153°15'42"E • Elevation 11m
 Values are percentage frequencies; * indicates the range occurred but with a frequency of less than 0.5%.

9 am January

| Calm | 1358 observations | | | | | | | | | |
|-------|-------------------|----|---|----|----|----|---|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 7 | 8 | 2 | 8 | 13 | 12 | 6 | 7 | 64 | |
| 11-20 | * | * | 1 | 2 | 3 | 1 | * | * | 8 | |
| 21-30 | * | 1 | * | 1 | 1 | * | * | * | 3 | |
| >30 | * | * | * | * | * | * | * | * | 1 | |
| All | 8 | 9 | 3 | 11 | 17 | 13 | 6 | 8 | 100 | |

9 am July

| Calm | 1347 observations | | | | | | | | | |
|-------|-------------------|----|---|----|---|----|----|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 5 | 1 | 1 | 2 | 4 | 18 | 14 | 10 | 56 | |
| 11-20 | * | * | * | * | 1 | 2 | 3 | 2 | 9 | |
| 21-30 | * | * | * | * | * | 2 | 1 | 4 | | |
| >30 | * | * | * | * | * | 1 | * | 2 | | |
| All | 5 | 1 | 1 | 3 | 6 | 21 | 21 | 14 | 100 | |

3 pm January

| Calm | 1352 observations | | | | | | | | | |
|-------|-------------------|----|----|----|----|----|---|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 3 | 13 | 6 | 13 | 4 | 2 | 1 | 2 | 45 | |
| 11-20 | 2 | 10 | 7 | 8 | 4 | * | * | 1 | 32 | |
| 21-30 | 1 | 5 | 2 | 5 | 2 | * | * | * | 16 | |
| >30 | * | 2 | * | 1 | 1 | * | * | * | 5 | |
| All | 7 | 30 | 16 | 26 | 11 | 3 | 1 | 3 | 100 | |

9 am February

| Calm | 1237 observations | | | | | | | | | |
|-------|-------------------|----|---|----|----|----|---|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 5 | 4 | 2 | 9 | 11 | 17 | 8 | 7 | 63 | |
| 11-20 | 1 | * | 1 | 2 | 3 | 2 | 1 | * | 10 | |
| 21-30 | * | * | * | 1 | 1 | * | * | * | 1 | |
| >30 | * | * | * | * | * | * | * | * | 1 | |
| All | 5 | 4 | 3 | 13 | 15 | 19 | 9 | 8 | 100 | |

9 am August

| Calm | 1318 observations | | | | | | | | | |
|-------|-------------------|----|---|----|---|----|----|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 5 | 2 | 1 | 2 | 5 | 15 | 14 | 11 | 55 | |
| 11-20 | * | * | * | * | 1 | 3 | 3 | 3 | 11 | |
| 21-30 | * | * | * | * | * | 1 | 2 | 1 | 4 | |
| >30 | * | * | * | * | * | 1 | * | 2 | | |
| All | 6 | 2 | 1 | 2 | 6 | 19 | 20 | 15 | 100 | |

3 pm February

| Calm | 1232 observations | | | | | | | | | |
|-------|-------------------|----|----|----|----|----|---|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 4 | 12 | 6 | 16 | 4 | 3 | 1 | 3 | 48 | |
| 11-20 | 1 | 7 | 6 | 11 | 5 | * | * | * | 32 | |
| 21-30 | * | 3 | 1 | 6 | 2 | * | * | * | 14 | |
| >30 | * | 1 | * | 2 | * | * | * | * | 4 | |
| All | 6 | 23 | 14 | 34 | 12 | 3 | 1 | 3 | 100 | |

9 am March

| Calm | 1345 observations | | | | | | | | | |
|-------|-------------------|----|---|----|----|----|---|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 4 | 3 | 1 | 8 | 14 | 19 | 9 | 9 | 66 | |
| 11-20 | * | * | * | 2 | 2 | 2 | * | 1 | 8 | |
| 21-30 | * | * | * | 1 | 1 | 1 | * | * | 3 | |
| >30 | * | * | * | * | * | * | * | * | 1 | |
| All | 4 | 3 | 2 | 11 | 17 | 22 | 9 | 9 | 100 | |

9 am September

| Calm | 1304 observations | | | | | | | | | |
|-------|-------------------|----|---|----|----|----|----|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 7 | 3 | 2 | 3 | 7 | 15 | 9 | 9 | 54 | |
| 11-20 | 1 | * | * | 1 | 3 | 4 | 2 | 2 | 13 | |
| 21-30 | * | * | * | * | 1 | 1 | 2 | 1 | 5 | |
| >30 | * | * | * | * | * | 1 | 1 | 2 | | |
| All | 8 | 3 | 2 | 5 | 11 | 20 | 14 | 13 | 100 | |

3 pm March

| Calm | 1344 observations | | | | | | | | | |
|-------|-------------------|----|----|----|----|----|---|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 4 | 11 | 6 | 14 | 6 | 4 | 1 | 2 | 48 | |
| 11-20 | 2 | 6 | 5 | 11 | 6 | 1 | * | 1 | 32 | |
| 21-30 | 1 | 3 | 1 | 5 | 3 | * | * | * | 13 | |
| >30 | * | 1 | * | 1 | 1 | * | * | * | 3 | |
| All | 7 | 20 | 12 | 32 | 15 | 4 | 2 | 3 | 100 | |

9 am April

| Calm | 1314 observations | | | | | | | | | |
|-------|-------------------|----|---|----|----|----|----|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 4 | 2 | 1 | 5 | 12 | 21 | 11 | 9 | 64 | |
| 11-20 | * | * | * | 1 | 2 | 3 | 1 | 1 | 9 | |
| 21-30 | * | * | * | * | 1 | 1 | * | * | 2 | |
| >30 | * | * | * | * | * | * | * | * | 1 | |
| All | 4 | 2 | 1 | 7 | 15 | 24 | 13 | 10 | 100 | |

9 am October

| Calm | 1326 observations | | | | | | | | | |
|-------|-------------------|----|---|----|----|----|----|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 7 | 6 | 3 | 7 | 8 | 13 | 6 | 10 | 59 | |
| 11-20 | 1 | 1 | * | 2 | 3 | 3 | 2 | 2 | 14 | |
| 21-30 | * | * | * | 1 | 2 | 2 | 1 | 1 | 6 | |
| >30 | * | * | * | * | * | * | * | * | 2 | |
| All | 9 | 7 | 3 | 10 | 12 | 18 | 10 | 13 | 100 | |

3 pm April

| Calm | 1304 observations | | | | | | | | | |
|-------|-------------------|----|----|----|----|----|---|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 4 | 8 | 5 | 13 | 7 | 5 | 2 | 4 | 49 | |
| 11-20 | 2 | 4 | 5 | 11 | 5 | 1 | 1 | 1 | 29 | |
| 21-30 | * | 2 | 1 | 4 | 3 | 1 | * | * | 10 | |
| >30 | * | * | * | 1 | 1 | * | * | * | 3 | |
| All | 6 | 13 | 11 | 29 | 15 | 8 | 3 | 5 | 100 | |

9 am May

| Calm | 1331 observations | | | | | | | | | |
|-------|-------------------|----|---|----|----|----|----|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 4 | 1 | 1 | 3 | 7 | 19 | 12 | 10 | 58 | |
| 11-20 | * | * | * | 1 | 2 | 2 | 2 | 1 | 8 | |
| 21-30 | * | * | * | * | 1 | 1 | 1 | 3 | | |
| >30 | * | * | * | * | * | * | * | 1 | | |
| All | 4 | 2 | 2 | 4 | 10 | 22 | 14 | 12 | 100 | |

9 am November

| Calm | 1249 observations | | | | | | | | | |
|-------|-------------------|----|---|----|----|----|---|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 8 | 6 | 2 | 6 | 10 | 13 | 7 | 11 | 64 | |
| 11-20 | 1 | 1 | * | 3 | 3 | 2 | 1 | 1 | 11 | |
| 21-30 | * | * | * | 1 | * | * | * | 2 | | |
| >30 | * | * | * | * | * | * | * | 1 | | |
| All | 9 | 7 | 3 | 9 | 14 | 15 | 9 | 12 | 100 | |

3 pm May

| Calm | 1318 observations | | | | | | | | | |
|-------|-------------------|----|---|----|----|----|---|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 6 | 6 | 4 | 12 | 10 | 9 | 4 | 7 | 58 | |
| 11-20 | * | 2 | 1 | 6 | 5 | 3 | 1 | 2 | 20 | |
| 21-30 | * | * | * | 2 | 2 | 2 | 1 | 1 | 7 | |
| >30 | * | * | * | * | * | 1 | 1 | 1 | 3 | |
| All | 6 | 8 | 6 | 20 | 17 | 14 | 7 | 10 | 100 | |

9 am June

| Calm | 1312 observations | | | | | | | | | |
|-------|-------------------|----|---|----|---|----|----|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 3 | 1 | 1 | 3 | 7 | 19 | 13 | 9 | 56 | |
| 11-20 | * | * | * | 1 | 2 | 3 | 2 | 1 | 8 | |
| 21-30 | * | * | * | * | 1 | 1 | 1 | 4 | | |
| >30 | * | * | * | * | * | 1 | * | 2 | | |
| All | 3 | 1 | 1 | 4 | 9 | 23 | 17 | 12 | 100 | |

9 am December

| Calm | 1324 observations | | | | | | | | | |
|-------|-------------------|----|---|----|----|----|---|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 7 | 7 | 2 | 8 | 11 | 12 | 7 | 9 | 64 | |
| 11-20 | 1 | * | * | 3 | 3 | 2 | 1 | 1 | 12 | |
| 21-30 | * | * | * | 1 | 1 | * | * | 2 | | |
| >30 | * | * | * | * | * | * | * | 1 | | |
| All | 8 | 7 | 3 | 12 | 15 | 15 | 8 | 11 | 100 | |

3 pm June

| Calm | 1308 observations | | | | | | | | | |
|-------|-------------------|----|---|----|----|----|----|----|-----|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | |
| 1-10 | 5 | 3 | 2 | 9 | 11 | 12 | 6 | 7 | 54 | |
| 11-20 | 1 | * | 1 | 4 | 5 | 4 | 2 | 3 | 20 | |
| 21-30 | * | * | * | 1 | 2 | 2 | 1 | 1 | 8 | |
| >30 | * | * | * | 1 | 1 | 1 | 2 | 1 | 5 | |
| All | 6 | 4 | 3 | 15 | 18 | 19 | 11 | 12 | 100 | |



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Appendix C1 (cont'd)

Wind Frequency analysis using available data between 1957 and 2000 for LISMORE (CENTRE STREET)

Site Number 058037 • Locality: LISMORE • Opened Jan 1884 • Still Open • Latitude 28°48'33"S • Longitude 153°15'42"E • Elevation 11m
Values are percentage frequencies; * indicates the range occurred but with a frequency of less than 0.5%.

3 pm July

| Calm 11 | | 1345 observations | | | | | | | | | |
|---------|---|-------------------|---|----|----|----|----|----|-----|---|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | | |
| 1-10 | 4 | 4 | 3 | 8 | 8 | 10 | 7 | 9 | 53 | | |
| 11-20 | 2 | 1 | 1 | 4 | 4 | 3 | 3 | 2 | 21 | | |
| 21-30 | * | * | * | 2 | 1 | 1 | 3 | 2 | 9 | | |
| >30 | | | | * | 1 | * | 1 | 3 | 1 | 6 | |
| All | 7 | 5 | 4 | 14 | 14 | 16 | 15 | 14 | 100 | | |

3 pm August

| Calm 8 | | 1306 observations | | | | | | | | | |
|--------|---|-------------------|---|----|----|----|----|----|-----|--|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | | |
| 1-10 | 7 | 6 | 3 | 8 | 7 | 8 | 5 | 9 | 53 | | |
| 11-20 | 2 | 3 | 2 | 4 | 4 | 3 | 3 | 4 | 25 | | |
| 21-30 | * | 1 | * | 2 | 1 | 1 | 2 | 1 | 9 | | |
| >30 | * | | * | * | 1 | 1 | 3 | 1 | 6 | | |
| All | 9 | 10 | 6 | 15 | 12 | 12 | 13 | 15 | 100 | | |

3 pm September

| Calm 5 | | 1298 observations | | | | | | | | | |
|--------|---|-------------------|---|----|---|----|---|----|-----|--|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | | |
| 1-10 | 5 | 10 | 3 | 10 | 3 | 4 | 2 | 7 | 45 | | |
| 11-20 | 3 | 6 | 3 | 6 | 3 | 1 | 2 | 5 | 29 | | |
| 21-30 | 1 | 3 | 2 | 3 | 2 | 1 | 2 | 2 | 15 | | |
| >30 | * | 1 | * | 1 | 1 | 1 | 3 | 1 | 6 | | |
| All | 9 | 19 | 9 | 19 | 8 | 8 | 8 | 15 | 100 | | |

3 pm October

| Calm 3 | | 1323 observations | | | | | | | | | |
|--------|---|-------------------|----|----|---|----|---|----|-----|--|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | | |
| 1-10 | 3 | 13 | 3 | 7 | 1 | 2 | 2 | 5 | 36 | | |
| 11-20 | 5 | 9 | 7 | 7 | 3 | 1 | 1 | 3 | 36 | | |
| 21-30 | 1 | 5 | 4 | 4 | 2 | * | 1 | 1 | 19 | | |
| >30 | * | 2 | * | 1 | 1 | 1 | 1 | 1 | 7 | | |
| All | 9 | 30 | 14 | 19 | 7 | 4 | 5 | 9 | 100 | | |

3 pm November

| Calm 2 | | 1239 observations | | | | | | | | | |
|--------|----|-------------------|----|----|---|----|---|----|-----|--|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | | |
| 1-10 | 5 | 12 | 5 | 9 | 2 | 2 | 1 | 3 | 38 | | |
| 11-20 | 3 | 11 | 8 | 7 | 3 | 1 | 1 | 2 | 35 | | |
| 21-30 | 1 | 7 | 2 | 4 | 2 | * | 1 | 1 | 19 | | |
| >30 | 1 | 2 | * | 1 | * | 1 | * | 1 | 6 | | |
| All | 10 | 31 | 15 | 20 | 8 | 4 | 3 | 7 | 100 | | |

3 pm December

| Calm 2 | | 1321 observations | | | | | | | | | |
|--------|---|-------------------|----|----|---|----|---|----|-----|--|--|
| km/h | N | NE | E | SE | S | SW | W | NW | All | | |
| 1-10 | 5 | 13 | 5 | 10 | 3 | 2 | 1 | 3 | 41 | | |
| 11-20 | 3 | 10 | 8 | 8 | 4 | 1 | 1 | 1 | 35 | | |
| 21-30 | 1 | 7 | 3 | 4 | 2 | * | * | 1 | 17 | | |
| >30 | * | 2 | * | 2 | * | * | * | * | 5 | | |
| All | 8 | 32 | 16 | 23 | 9 | 3 | 2 | 5 | 100 | | |



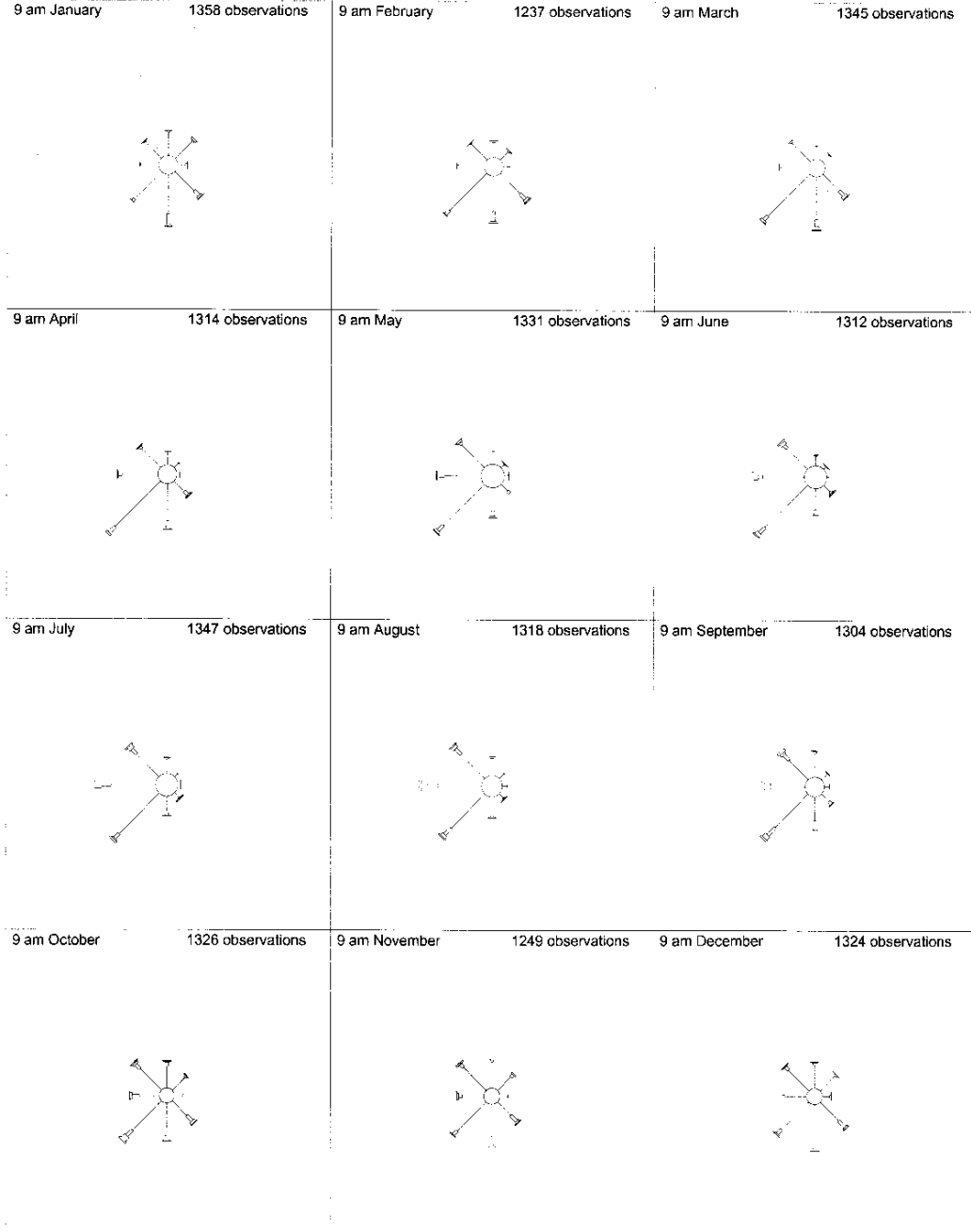
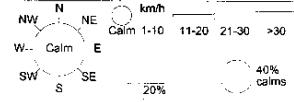
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Appendix CII

Wind Roses using available data between 1957 and 2000 for LISMORE (CENTRE STREET)

Site Number 058037 • Locality: LISMORE • Opened Jan 1884 • Still Open
 Latitude 28°48'33"S • Longitude 153°15'42"E • Elevation 11m

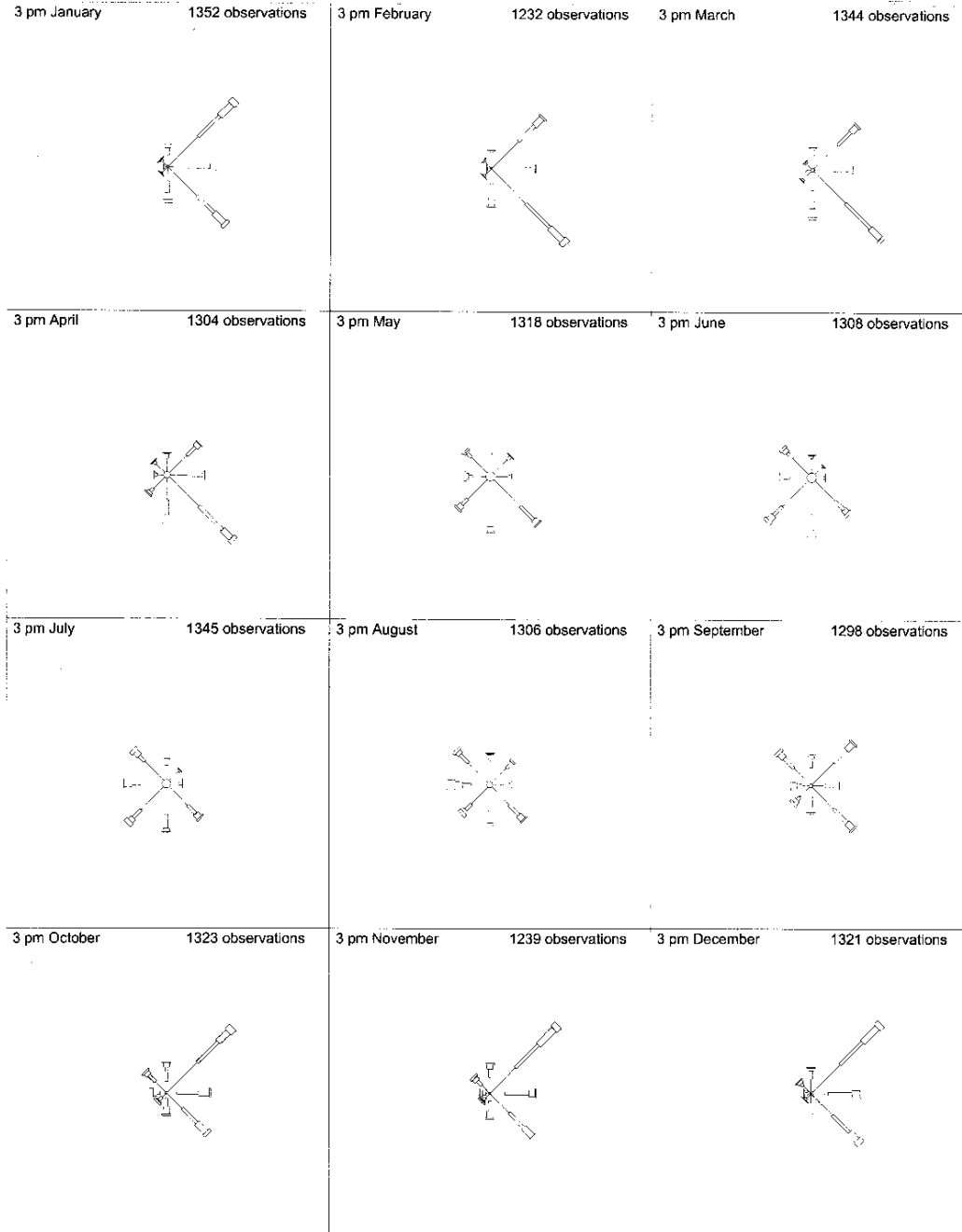
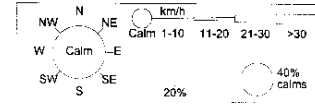


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Appendix CII (cont'd)

Wind Roses using available data between 1957 and 2000 for LISMORE (CENTRE STREET)

Site Number 058037 • Locality: LISMORE • Opened Jan 1884 • Still Open
 Latitude 28°48'33"S • Longitude 153°15'42"E • Elevation 11m



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Climatological Summary for LISMORE (CENTRE STREET) using data from 1884 to 2000

Site Number 058037 • Locality: LISMORE • Opened Jan 1884 • Still Open • Latitude 28°48'33"S • Longitude 153°15'42"E • Elevation 11m

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual | Years of Record |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|-----------------|
| Mean Daily Maximum Temp (°C) | 29.8 | 29.1 | 27.9 | 25.7 | 22.6 | 20.2 | 19.9 | 21.5 | 24.2 | 26.6 | 28.3 | 29.7 | 25.5 | 93 |
| Highest Temperature (°C) | 43.0 | 40.9 | 37.2 | 35.6 | 30.2 | 27.9 | 28.9 | 32.7 | 34.6 | 39.8 | 42.2 | 40.6 | 43.0 | 44 |
| Lowest Maximum Temperature (°C) | 20.0 | 20.0 | 18.9 | 16.2 | 15.2 | 13.0 | 11.8 | 12.4 | 14.2 | 15.5 | 16.7 | 18.1 | 11.8 | 44 |
| Mean Number of days over 30°C | 13.8 | 10.1 | 7.7 | 2.4 | 0.1 | nil | nil | 0.1 | 1.4 | 5.5 | 8.6 | 12.7 | 62.4 | 43 |
| Mean Number of days over 35°C | 1.9 | 1.0 | 0.3 | nil | nil | nil | nil | nil | nil | 0.6 | 1.5 | 2.4 | 7.8 | 43 |
| Mean Daily Minimum Temp (°C) | 18.9 | 18.8 | 17.3 | 14.2 | 10.9 | 8.2 | 6.6 | 7.2 | 9.9 | 13.2 | 15.9 | 17.8 | 13.2 | 93 |
| Lowest Temperature (°C) | 11.6 | 11.8 | 10.0 | 5.0 | 1.1 | -1.0 | -3.5 | -2.0 | -0.3 | 2.8 | 6.1 | 7.8 | -3.5 | 44 |
| Highest Minimum Temperature (°C) | 26.5 | 26.4 | 23.6 | 21.8 | 20.8 | 18.5 | 17.7 | 17.2 | 19.4 | 21.1 | 26.7 | 23.9 | 26.7 | 43 |
| Mean Number of Days below 2.2°C | nil | nil | nil | nil | 0.2 | 1.8 | 4.9 | 2.2 | 0.2 | nil | nil | nil | 9.2 | 43 |
| Mean Number of Days below 0°C | nil | nil | nil | nil | nil | 0.2 | 0.9 | 0.2 | nil | nil | nil | nil | 1.3 | 43 |
| Mean Daily Terrestrial Minimum (°C) | | | | | | | | | | | | | | 0 |
| Lowest Daily Terrestrial Minimum (°C) | | | | | | | | | | | | | | 0 |
| Number of Days Terrestrial below -0.9°C | | | | | | | | | | | | | | 0 |
| Mean 9am Temperature (°C) | 24.4 | 23.6 | 22.2 | 19.5 | 15.8 | 12.8 | 11.8 | 13.7 | 17.6 | 21.1 | 22.9 | 24.4 | 19.1 | 94 |
| Mean 3pm Temperature (°C) | 28.5 | 27.9 | 26.8 | 24.5 | 21.6 | 19.4 | 19.1 | 20.5 | 22.9 | 24.8 | 26.9 | 28.1 | 24.2 | 61 |
| Mean 9am Relative Humidity (%) | 74 | 79 | 80 | 80 | 81 | 81 | 78 | 73 | 68 | 65 | 67 | 69 | 74.5 | 93 |
| Mean 3pm Relative Humidity (%) | 58 | 61 | 60 | 58 | 59 | 56 | 50 | 46 | 46 | 50 | 51 | 54 | 54.2 | 61 |
| Mean 9am Cloud Cover (oktas) | 4.4 | 4.5 | 4.2 | 3.7 | 3.6 | 3.3 | 2.9 | 2.5 | 2.5 | 3.3 | 3.6 | 3.9 | 3.5 | 93 |
| Mean 3pm Cloud Cover (oktas) | 4.7 | 5.1 | 4.7 | 4.3 | 4.2 | 3.8 | 3.3 | 3.3 | 3.1 | 3.9 | 4.1 | 4.2 | 4.1 | 61 |
| Maximum Wind Gust (km/h) | | | | | | | | | | | | | | 0 |
| Mean Daily Wind Run (km) | | | | | | | | | | | | | | 0 |
| Mean Number of Days of Strong Wind | 0.5 | 0.4 | 0.5 | 0.3 | 0.4 | 1.0 | 1.1 | 1.0 | 1.0 | 0.9 | 0.8 | 0.7 | 8.5 | 44 |
| Mean Number of Days of Gales | 0.1 | 0.1 | nil | nil | nil | nil | 0.1 | nil | 0.1 | nil | 0.1 | nil | 0.7 | 44 |
| Mean Daily Pan Evaporation (mm) | | | | | | | | | | | | | | 0 |
| Mean Daily Sunshine (hours) | | | | | | | | | | | | | | 0 |
| Mean Number of Days with Hail | 0.2 | 0.1 | nil | 0.2 | nil | 0.1 | nil | nil | 0.1 | 0.2 | 0.2 | 0.2 | 1.3 | 44 |
| Mean Number of Days with Snow | nil | nil | nil | nil | nil | nil | nil | nil | nil | nil | nil | nil | nil | 44 |
| Mean Number of Days with Frost | nil | nil | nil | nil | 0.2 | 1.5 | 4.6 | 1.8 | 0.1 | nil | nil | nil | 8.3 | 44 |
| Mean Number of Days with Fog | 1.7 | 2.7 | 3.6 | 4.9 | 5.3 | 4.4 | 3.7 | 3.7 | 3.8 | 2.4 | 1.7 | 1.7 | 39.5 | 44 |
| Mean Number of Days with Thunder | 3.7 | 2.3 | 1.6 | 0.8 | 0.3 | 0.3 | 0.4 | 0.7 | 1.7 | 2.7 | 4.0 | 4.6 | 23.0 | 44 |
| Mean Number of Clear Days | 5.6 | 4.4 | 6.4 | 7.8 | 8.3 | 10.9 | 13.4 | 13.3 | 13.5 | 10.3 | 7.4 | 7.5 | 108.9 | 43 |
| Mean Number of Cloudy Days | 13.8 | 13.6 | 13.1 | 10.8 | 11.8 | 10.4 | 8.5 | 7.0 | 6.1 | 9.1 | 10.9 | 12.1 | 127.1 | 43 |
| Mean Monthly Rainfall (mm) | 157.8 | 182.5 | 188.7 | 129.7 | 115.6 | 96.8 | 81.7 | 55.7 | 51.8 | 72.8 | 94.6 | 122.1 | 1350.0 | 117 |
| Highest Monthly Rainfall (mm) | 461.2 | 799.0 | 670.9 | 529.0 | 460.1 | 608.7 | 460.8 | 364.0 | 212.8 | 532.4 | 365.9 | 462.1 | | 117 |
| Lowest Monthly Rainfall (mm) | 12.3 | 12.5 | 2.8 | 4.1 | 1.3 | 0.0 | 0.0 | 0.0 | 0.0 | 2.8 | 5.3 | 3.6 | | 117 |
| Mean number of Rain days | 13.1 | 13.9 | 15.5 | 12.4 | 11.6 | 9.5 | 8.3 | 7.5 | 7.5 | 9.0 | 10.0 | 11.4 | 129.6 | 116 |
| Highest number of Rain days | 23 | 27 | 29 | 25 | 23 | 23 | 21 | 17 | 18 | 18 | 20 | 25 | | 116 |
| Lowest number of Rain days | 5 | 3 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | | 116 |



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