



Appendix G

Wind Roses of DEC's St Marys 2005 Meteorological Data

appendix



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Suite 2B, 14 Glen St
Eastwood NSW 2122
Ph. 61-2-9874 8644

Shane.Lakmaker@holmair.com.au

Data preparation: St Marys meteorological data for 2005, collected by DEC
Date: 3 July 2006
Client: Daniel Woods/Evonne Tzimopoulos, Peter J Ramsay and Associates
Output: AUSPLUME format meteorological data file (stm2005.met)

Settings:

Stability class was calculated for each hour of the meteorological data using sigma-theta according to the method recommended by the US EPA (**US EPA, 1986**).

Mixing height was determined using a scheme defined by **Powell (1976)** for day-time conditions and an approach described by **Venkatram (1980)** for night-time conditions.

Roughness length = 0.3 m
Anemometer height = 10 m
Longitude = 150.77 E
Latitude = 33.80 S
Minimum mixing height = 50 m

References

Powell D C (1976)

"A Formulation of Time-varying Depths of Daytime Mixed Layer and Night-time Stable Layer for use in Air Pollution Assessment Models", Annual Report for 1976 Part 3, Battelle PNL Atmospheric Sciences, 185-189.

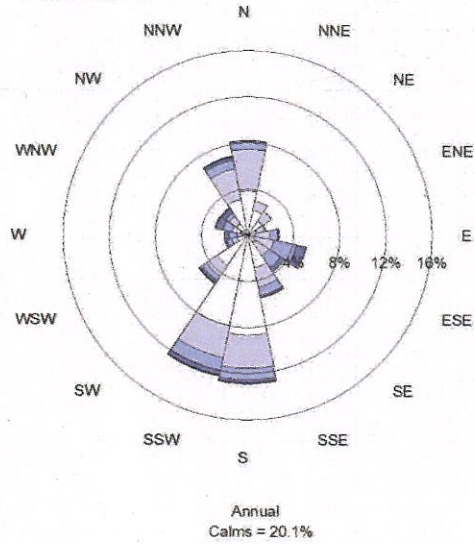
US EPA (1986)

"Guideline on air quality models (revised)", Prepared by the United States Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711, EPA-450/2-78-027R.

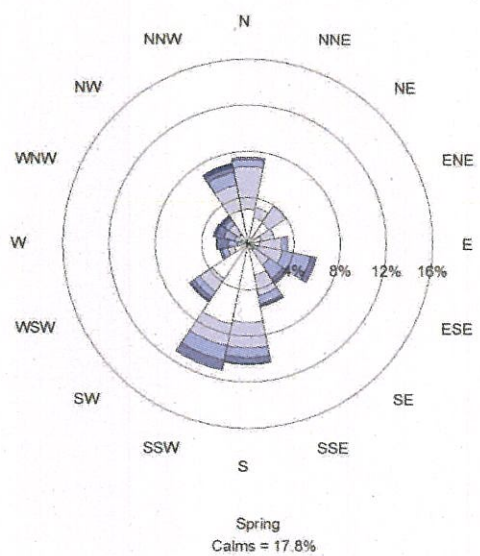
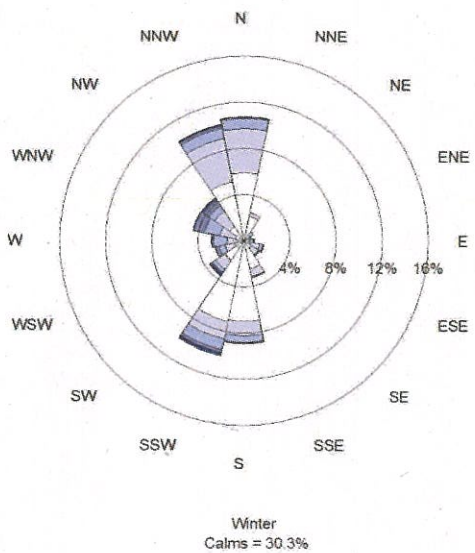
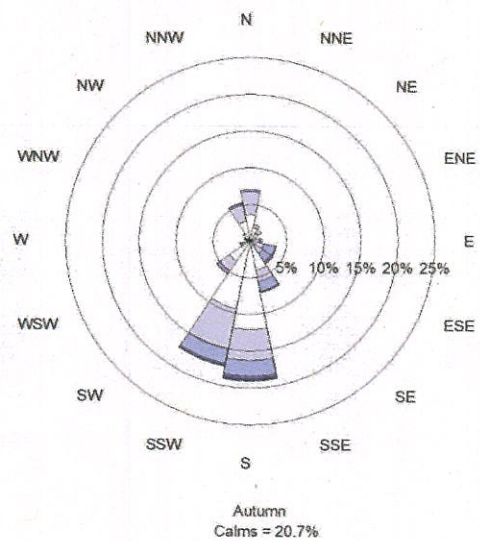
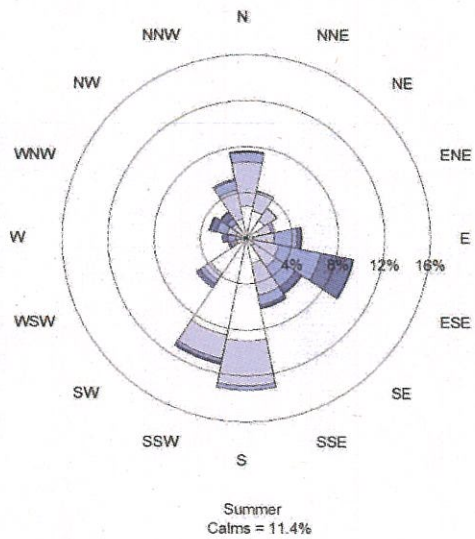
Venkatram (1980)

"Estimating the Monin-Obukhov Length in the Stable Boundary Layer for Dispersion Calculations", Boundary-Layer Meteorology, Volume 19, 481-485.

Wind-roses:



Annual and seasonal windroses for St Marys (DEC 2005 data)



STATISTICS FOR FILE: C:\Jobs\DWoods\StMarys\stm2005.met
MONTHS: All
HOURS : All
OPTION: Frequency

Wind Speed Class (m/s)

PASQUILL STABILITY CLASS 'B'

Wind Speed Class (m/s)

[illegible]

PASQUILL STABILITY CLASS 'C'

Wind Speed Class (m/s)

WIND SECTOR	0.50 TO 1.50	1.50 TO 3.00	3.00 TO 4.50	4.50 TO 6.00	6.00 TO 7.50	7.50 TO 9.00	9.00 TO 10.50	GREATER THAN 10.50	TOTAL
NNE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
NE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
ENE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
E	0.000000	0.000685	0.002055	0.000799	0.000000	0.000000	0.000000	0.000000	0.003539
ESE	0.000000	0.001941	0.009018	0.007534	0.000000	0.000000	0.000000	0.000000	0.018493
SE	0.000228	0.000799	0.004452	0.003539	0.000000	0.000000	0.000000	0.000000	0.009018
SSE	0.000571	0.001598	0.002626	0.001142	0.000000	0.000000	0.000000	0.000000	0.005936
S	0.002968	0.005479	0.004909	0.001256	0.000000	0.000000	0.000000	0.000000	0.014612
SSW	0.001712	0.003995	0.003425	0.001370	0.000000	0.000000	0.000000	0.000000	0.010502
SW	0.000114	0.001256	0.001027	0.001484	0.000000	0.000000	0.000000	0.000000	0.003881
WSW	0.000114	0.000114	0.000342	0.000571	0.000000	0.000000	0.000000	0.000000	0.001142
W	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
WNW	0.000000	0.000000	0.001027	0.001484	0.000000	0.000000	0.000000	0.000000	0.002511
NW	0.000114	0.000571	0.001142	0.001941	0.000000	0.000000	0.000000	0.000000	0.003767
NNW	0.000913	0.002854	0.002055	0.001027	0.000000	0.000000	0.000000	0.000000	0.006849
N	0.000457	0.001484	0.001826	0.000685	0.000000	0.000000	0.000000	0.000000	0.004452
CALM									0.000114
TOTAL	0.007192	0.020776	0.033904	0.022831	0.000000	0.000000	0.000000	0.000000	0.084817

MEAN WIND SPEED (m/s) = 3.59
NUMBER OF OBSERVATIONS = 743

PASQUILL STABILITY CLASS 'D'

Wind Speed Class (m/s)

WIND SECTOR	0.50 TO 1.50	1.50 TO 3.00	3.00 TO 4.50	4.50 TO 6.00	6.00 TO 7.50	7.50 TO 9.00	9.00 TO 10.50	GREATER THAN 10.50	TOTAL
NNE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
NE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
ENE	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
E	0.000000	0.000685	0.001027	0.000114	0.000228	0.000000	0.000000	0.000000	0.002055
ESE	0.000000	0.003425	0.006393	0.000913	0.000228	0.000000	0.000000	0.000000	0.010959
SE	0.000571	0.004909	0.006507	0.000342	0.000114	0.000000	0.000000	0.000000	0.012443
SSE	0.006393	0.005365	0.002854	0.000114	0.000571	0.000000	0.000000	0.000000	0.015297
S	0.025685	0.011872	0.002968	0.000685	0.001027	0.000228	0.000000	0.000000	0.042466
SSW	0.024429	0.016553	0.006164	0.002397	0.000571	0.000342	0.000228	0.000000	0.050685
SW	0.003995	0.004795	0.001826	0.000342	0.000685	0.000000	0.000342	0.000000	0.011986
WSW	0.000000	0.000799	0.001712	0.000342	0.000114	0.000000	0.000000	0.000000	0.002968
W	0.000000	0.000114	0.002055	0.000000	0.000342	0.000000	0.000000	0.000000	0.002511
WNW	0.000114	0.001484	0.002968	0.000685	0.001256	0.000000	0.000000	0.000000	0.006507
NW	0.000228	0.002740	0.001142	0.001256	0.001256	0.000228	0.000000	0.000000	0.006849
NNW	0.001598	0.005594	0.003881	0.001256	0.000799	0.000342	0.000114	0.000000	0.013584
N	0.002169	0.005594	0.001712	0.000114	0.000228	0.000000	0.000000	0.000000	0.009817
CALM									0.000799
TOTAL	0.065183	0.063927	0.041210	0.008562	0.007420	0.001142	0.000685	0.000000	0.188927

MEAN WIND SPEED (m/s) = 2.53
NUMBER OF OBSERVATIONS = 1655

PASQUILL STABILITY CLASS 'E'

		Wind Speed Class (m/s)									
		0.50	1.50	3.00	4.50	6.00	7.50	9.00	GREATER		
WIND	TO	TO	TO	TO	TO	TO	TO	TO	THAN		
SECTOR	1.50	3.00	4.50	6.00	7.50	9.00	10.50	10.50	TOTAL		
NNE	0.000114	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000114	
NE	0.000000	0.000000	0.000114	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000114	
ENE	0.000000	0.000228	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000228	
E	0.000457	0.001712	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.002169	
ESE	0.000228	0.002626	0.000114	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.002968	
SE	0.001027	0.002055	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.003082	
SSE	0.006849	0.002511	0.000114	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.009475	
S	0.020434	0.003082	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.023516	
SSW	0.017922	0.002169	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.020091	
SW	0.007763	0.001598	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.009361	
WSW	0.001027	0.000685	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.001712	
W	0.000342	0.001142	0.000114	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.001598	
WNW	0.000571	0.001598	0.000114	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.002283	
NW	0.000571	0.001142	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.001712	
NNW	0.002626	0.002397	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.005023	
N	0.002854	0.002511	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.005365	
CALM											0.002968
TOTAL	0.062785	0.025457	0.000571	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.091781	

MEAN WIND SPEED (m/s) = 1.30
NUMBER OF OBSERVATIONS = 804

PASQUILL STABILITY CLASS 'F'

		Wind Speed Class (m/s)									
		0.50	1.50	3.00	4.50	6.00	7.50	9.00	GREATER		
WIND	TO	TO	TO	TO	TO	TO	TO	TO	THAN		
SECTOR	1.50	3.00	4.50	6.00	7.50	9.00	10.50	10.50	TOTAL		
NNE	0.011073	0.001027	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.012100	
NE	0.009475	0.006507	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.015982	
ENE	0.004795	0.003653	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.008447	
E	0.002740	0.002740	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.005479	
ESE	0.001941	0.001826	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.003767	
SE	0.002626	0.001484	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.004110	
SSE	0.009132	0.001142	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.010274	
S	0.025000	0.001826	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.026826	
SSW	0.026826	0.001027	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.027854	
SW	0.013356	0.001370	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.014726	
WSW	0.004566	0.001256	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.005822	
W	0.001826	0.001826	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.003653	
WNW	0.003082	0.001712	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.004795	
NW	0.003311	0.000457	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.003767	
NNW	0.007078	0.001027	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.008105	
N	0.017009	0.002511	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.019521	
CALM											0.151598
TOTAL	0.143836	0.031393	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.326826	

MEAN WIND SPEED (m/s) = 0.80
NUMBER OF OBSERVATIONS = 2863

ALL PASQUILL STABILITY CLASSES

WIND SECTOR	Wind Speed Class (m/s)								TOTAL
	0.50 TO 1.50	1.50 TO 3.00	3.00 TO 4.50	4.50 TO 6.00	6.00 TO 7.50	7.50 TO 9.00	9.00 TO 10.50	GREATER THAN 10.50	
NNE	0.021575	0.008676	0.000114	0.000000	0.000000	0.000000	0.000000	0.000000	0.030365
NE	0.014612	0.009932	0.000114	0.000000	0.000000	0.000000	0.000000	0.000000	0.024658
ENE	0.007877	0.007078	0.000799	0.000000	0.000000	0.000000	0.000000	0.000000	0.015753
E	0.006279	0.012215	0.007192	0.001142	0.000228	0.000000	0.000000	0.000000	0.027055
ESE	0.005822	0.016895	0.020320	0.008790	0.000228	0.000000	0.000000	0.000000	0.052055
SE	0.007306	0.014384	0.012215	0.004224	0.000114	0.000000	0.000000	0.000000	0.038242
SSE	0.028653	0.017123	0.007534	0.001598	0.000571	0.000000	0.000000	0.000000	0.055479
S	0.086416	0.029110	0.009932	0.002283	0.001027	0.000228	0.000000	0.000000	0.128995
SSW	0.080023	0.028196	0.011530	0.003881	0.000571	0.000342	0.000228	0.000000	0.124772
SW	0.031621	0.011301	0.004680	0.002397	0.000685	0.000000	0.000342	0.000000	0.051027
WSW	0.009361	0.005023	0.004110	0.001826	0.000114	0.000000	0.000000	0.000000	0.020434
W	0.004338	0.005023	0.006849	0.003995	0.000342	0.000000	0.000000	0.000000	0.020548
WNW	0.006621	0.007078	0.008447	0.005822	0.001256	0.000000	0.000000	0.000000	0.029224
NW	0.011986	0.007648	0.003881	0.003539	0.001256	0.000228	0.000000	0.000000	0.028539
NNW	0.031507	0.027055	0.007763	0.002397	0.000799	0.000342	0.000114	0.000000	0.069977
N	0.038128	0.036187	0.006507	0.001027	0.000228	0.000000	0.000000	0.000000	0.082078
CALM									0.200799
TOTAL	0.392123	0.242922	0.111986	0.042922	0.007420	0.001142	0.000685	0.000000	1.000000

MEAN WIND SPEED (m/s) = 1.71
NUMBER OF OBSERVATIONS = 8760

FREQUENCY OF OCCURENCE OF STABILITY CLASSES

A : 23.9%
B : 6.9%
C : 8.5%
D : 18.9%
E : 9.2%
F : 32.7%