



Systems Applications International, Inc.

Mid-Atlantic Regional Air Management
Association (MARAMA)

Development of CART-Based
PM_{2.5} Forecasting Tools for
Selected Cities within the
MARAMA Region

Appendix A: Wind Distribution
Plots for Low, Moderate, and
High PM Days

Draft Report

July 30, 2004

This page intentionally left blank.

Systems Applications International, Inc.

Mid-Atlantic Regional Air Management
Association (MARAMA)

Development of CART-Based
PM_{2.5} Forecasting Tools for
Selected Cities within the
MARAMA Region

Appendix A: Wind Distribution
Plots for Low, Moderate, and
High PM Days

Draft Report

July 30, 2004

Prepared for:

Bill Gillespie
Mid-Atlantic Regional Air Management Association (MARAMA)
711 W. 40th Street, Suite 318
Baltimore, MD 21211-2109
(410) 467-0170

Prepared by:

Sharon G. Douglas
A. Belle Hudischewskyj
Johanna B. Mangahas
Jay L. Haney
ICF Consulting/SAI
101 Lucas Valley Road, Suite 260
San Rafael, CA 94093
(415) 507-7108

This page intentionally left blank.

Table of Contents

List of Figures

Figure A-1a. 850 mb (am) Winds for Greensboro (1999–2002) for Low PM _{2.5} Days in Charlotte (Class 1/Green Days)	A-1
Figure A-1b. 850 mb (am) Winds for Greensboro (1999–2002) for Moderate PM _{2.5} Days in Charlotte (Class 2/Yellow Days)	A-2
Figure A-1c. 850 mb (am) Winds for Greensboro (1999–2002) for High PM _{2.5} Days in Charlotte (Class 3/Orange Days)	A-3
Figure A-2a. 850 mb (pm) Winds for Greensboro (1999–2002) for Low PM _{2.5} Days in Charlotte (Class 1/Green Days)	A-4
Figure A-2b. 850 mb (pm) Winds for Greensboro (1999–2002) for Moderate PM _{2.5} Days in Charlotte (Class 2/Yellow Days)	A-5
Figure A-2c. 850 mb (pm) Winds for Greensboro (1999–2002) for High PM _{2.5} Days in Charlotte (Class 3/Orange Days)	A-6
Figure A-3a. 850 mb (am) Winds for Roanoke (1999–2002) for Low PM _{2.5} Days in Bristol (Class 1/Green Days)	A-7
Figure A-3b. 850 mb (am) Winds for Roanoke (1999–2002) for Moderate PM _{2.5} Days in Bristol (Class 2/Yellow Days)	A-8
Figure A-3c. 850 mb (am) Winds for Roanoke (1999–2002) for High PM _{2.5} Days in Bristol (Class 3/Orange Days)	A-9
Figure A-4a. 850 mb (pm) Winds for Roanoke (1999–2002) for Low PM _{2.5} Days in Bristol (Class 1/Green Days)	A-10
Figure A-4b. 850 mb (pm) Winds for Roanoke (1999–2002) for Moderate PM _{2.5} Days in Bristol (Class 2/Yellow Days)	A-11
Figure A-4c. 850 mb (pm) Winds for Roanoke (1999–2002) for High PM _{2.5} Days in Bristol (Class 3/Orange Days)	A-12
Figure A-5a. 850 mb (am) Winds for Roanoke (1999–2002) for Low PM _{2.5} Days in Roanoke (Class 1/Green Days)	A-13
Figure A-5b. 850 mb (am) Winds for Roanoke (1999–2002) for Moderate PM _{2.5} Days in Roanoke (Class 2/Yellow Days)	A-14
Figure A-6a. 850 mb (pm) Winds for Roanoke (1999–2002) for Low PM _{2.5} Days in Roanoke (Class 1/Green Days)	A-15
Figure A-6b. 850 mb (pm) Winds for Roanoke (1999–2002) for Moderate PM _{2.5} Days in Roanoke (Class 2/Yellow Days)	A-16
Figure A-7a. 850 mb (am) Winds for Dulles (1999–2002) for Low PM _{2.5} Days in Richmond (Class 1/Green Days)	A-17
Figure A-7b. 850 mb (am) Winds for Dulles (1999–2002) for Moderate PM _{2.5} Days in Richmond (Class 2/Yellow Days)	A-18
Figure A-8a. 850 mb (pm) Winds for Dulles (1999–2002) for Low PM _{2.5} Days in Richmond (Class 1/Green Days)	A-19
Figure A-8b. 850 mb (pm) Winds for Dulles (1999–2002) for Moderate PM _{2.5} Days in Richmond (Class 2/Yellow Days)	A-20
Figure A-8c. 850 mb (pm) Winds for Dulles (1999–2002) for High PM _{2.5} Days in Richmond (Class 3/Orange Days)	A-21
Figure A-9a. 850 mb (am) Winds for Dulles (1999–2002) for Low PM _{2.5} Days in Washington, D.C. (Class 1/Green Days)	A-22
Figure A-9b. 850 mb (am) Winds for Dulles (1999–2002) for Moderate PM _{2.5} Days in Washington, D.C. (Class 2/Yellow Days)	A-23
Figure A-9c. 850 mb (am) Winds for Dulles (1999–2002) for High PM _{2.5} Days in Washington, D.C. (Class 3/Orange Days)	A-24
Figure A-10a. 850 mb (pm) Winds for Dulles (1999–2002) for Low PM _{2.5} Days in Washington, D.C. (Class 1/Green Days)	A-25
Figure A-10b. 850 mb (pm) Winds for Dulles (1999–2002) for Moderate PM _{2.5} Days in Washington, D.C. (Class 2/Yellow Days)	A-26
Figure A-10c. 850 mb (pm) Winds for Dulles (1999–2002) for High PM _{2.5} Days in Washington, D.C. (Class 3/Orange Days)	A-27
Figure A-11a. 850 mb (am) Winds for Dulles (1999–2002) for Low PM _{2.5} Days in Baltimore (Class 1/Green Days)	A-28
Figure A-11b. 850 mb (am) Winds for Dulles (1999–2002) for Moderate PM _{2.5} Days in Baltimore (Class 2/Yellow Days)	A-29
Figure A-11c. 850 mb (am) Winds for Dulles (1999–2002) for High PM _{2.5} Days in Baltimore (Class 3/Orange Days)	A-30
Figure A-12a. 850 mb (pm) Winds for Dulles (1999–2002) for Low PM _{2.5} Days in Baltimore (Class 1/Green Days)	A-31
Figure A-12b. 850 mb (pm) Winds for Dulles (1999–2002) for Moderate PM _{2.5} Days in Baltimore (Class 2/Yellow Days)	A-32
Figure A-12c. 850 mb (pm) Winds for Dulles (1999–2002) for High PM _{2.5} Days in Baltimore (Class 3/Orange Days)	A-33
Figure A-13a. 850 mb (am) Winds for Dulles (1999–2002) for Low PM _{2.5} Days in Philadelphia (Class 1/Green Days)	A-34
Figure A-13b. 850 mb (am) Winds for Dulles (1999–2002) for Moderate PM _{2.5} Days in Philadelphia (Class 2/Yellow Days)	A-35
Figure A-13c. 850 mb (am) Winds for Dulles (1999–2002) for High PM _{2.5} Days in Philadelphia (Class 3/Orange Days)	A-36
Figure A-14a. 850 mb (pm) Winds for Dulles (1999–2002) for Low PM _{2.5} Days in Philadelphia (Class 1/Green Days)	A-37
Figure A-14b. 850 mb (pm) Winds for Dulles (1999–2002) for Moderate PM _{2.5} Days in Philadelphia (Class 2/Yellow Days)	A-38
Figure A-14c. 850 mb (pm) Winds for Dulles (1999–2002) for High PM _{2.5} Days in Philadelphia (Class 3/Orange Days)	A-39
Figure A-15a. 850 mb (am) Winds for Dulles (1999–2002) for Low PM _{2.5} Days in Wilmington (Class 1/Green Days)	A-40
Figure A-15b. 850 mb (am) Winds for Dulles (1999–2002) for Moderate PM _{2.5} Days in Wilmington (Class 2/Yellow Days)	A-41
Figure A-15c. 850 mb (am) Winds for Dulles (1999–2002) for High PM _{2.5} Days in Wilmington (Class 3/Orange Days)	A-42
Figure A-16a. 850 mb (pm) Winds for Dulles (1999–2002) for Low PM _{2.5} Days in Wilmington (Class 1/Green Days)	A-43
Figure A-16b. 850 mb (pm) Winds for Dulles (1999–2002) for Moderate PM _{2.5} Days in Wilmington (Class 2/Yellow Days)	A-44
Figure A-16c. 850 mb (pm) Winds for Dulles (1999–2002) for High PM _{2.5} Days in Wilmington (Class 3/Orange Days)	A-45
Figure A-17a. 850 mb (am) Winds for Brookhaven (1999–2002) for Low PM _{2.5} Days in Newark (Class 1/Green Days)	A-46
Figure A-17b. 850 mb (am) Winds for Brookhaven (1999–2002) for Moderate PM _{2.5} Days in Newark (Class 2/Yellow Days)	A-47
Figure A-17c. 850 mb (am) Winds for Brookhaven (1999–2002) for High PM _{2.5} Days in Newark (Class 3/Orange Days)	A-48
Figure A-18a. 850 mb (pm) Winds for Brookhaven (1999–2002) for Low PM _{2.5} Days in Newark (Class 1/Green Days)	A-49
Figure A-18b. 850 mb (pm) Winds for Brookhaven (1999–2002) for Moderate PM _{2.5} Days in Newark (Class 2/Yellow Days)	A-50
Figure A-18c. 850 mb (pm) Winds for Brookhaven (1999–2002) for High PM _{2.5} Days in Newark (Class 3/Orange Days)	A-51

This page intentionally left blank.

Figure A-1a.
850 mb (am) Winds for Greensboro (1999–2002)
for Low PM_{2.5} Days in Charlotte (Class 1/Green Days)

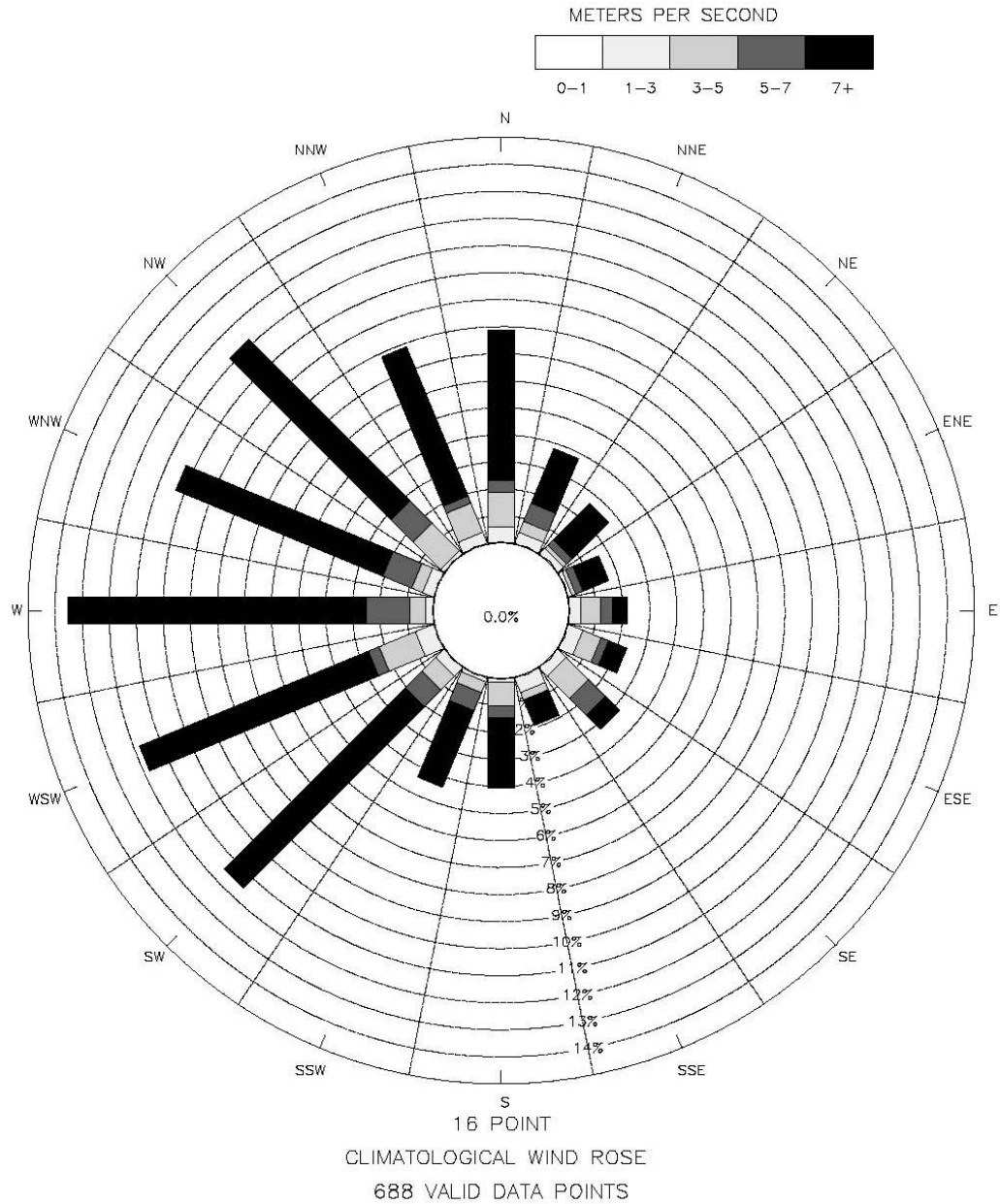


Figure A-1b.
850 mb (am) Winds for Greensboro (1999–2002)
for Moderate PM_{2.5} Days in Charlotte (Class 2/Yellow Days)

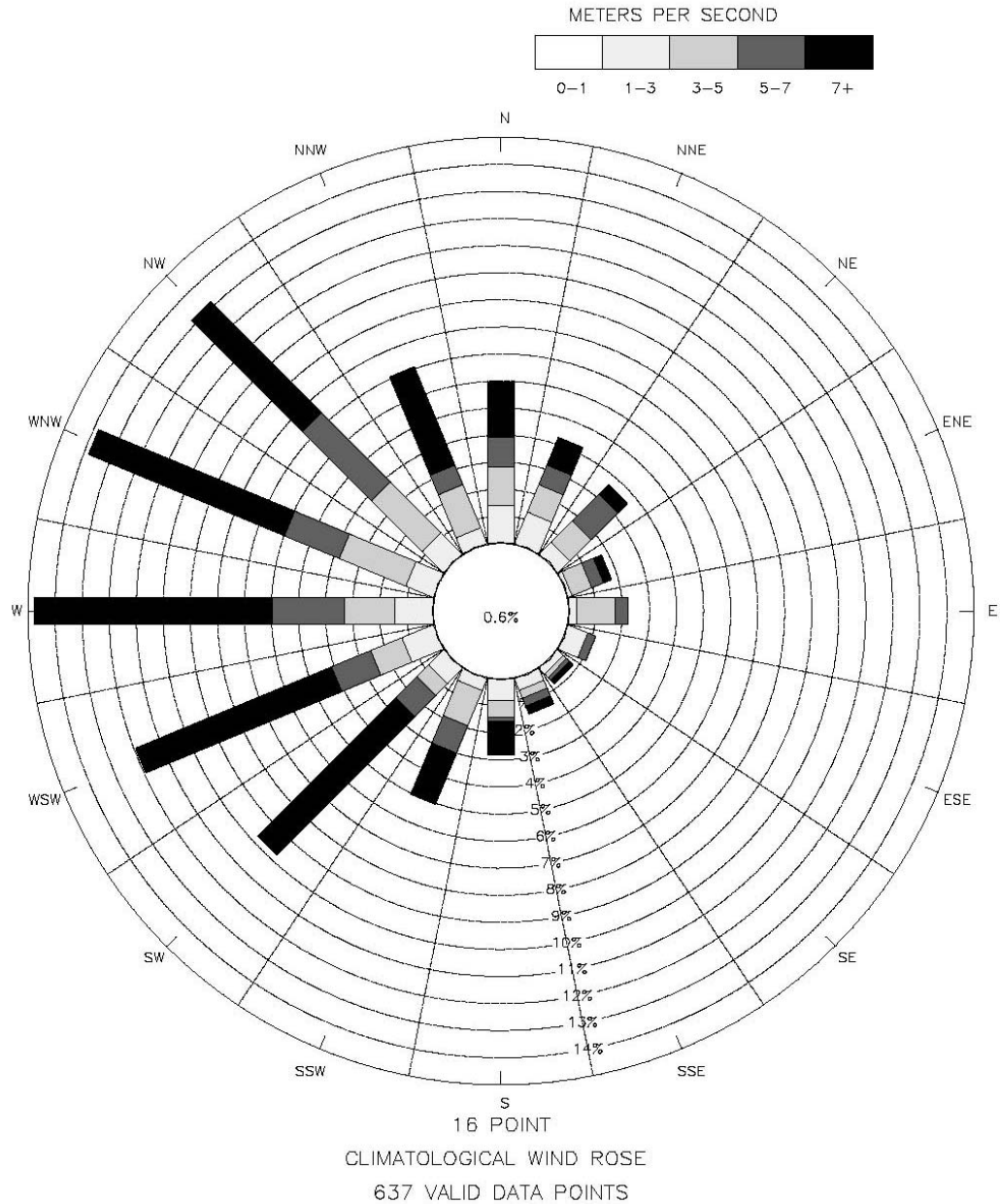


Figure A-1c.
850 mb (am) Winds for Greensboro (1999–2002)
for High PM_{2.5} Days in Charlotte (Class 3/Orange Days)

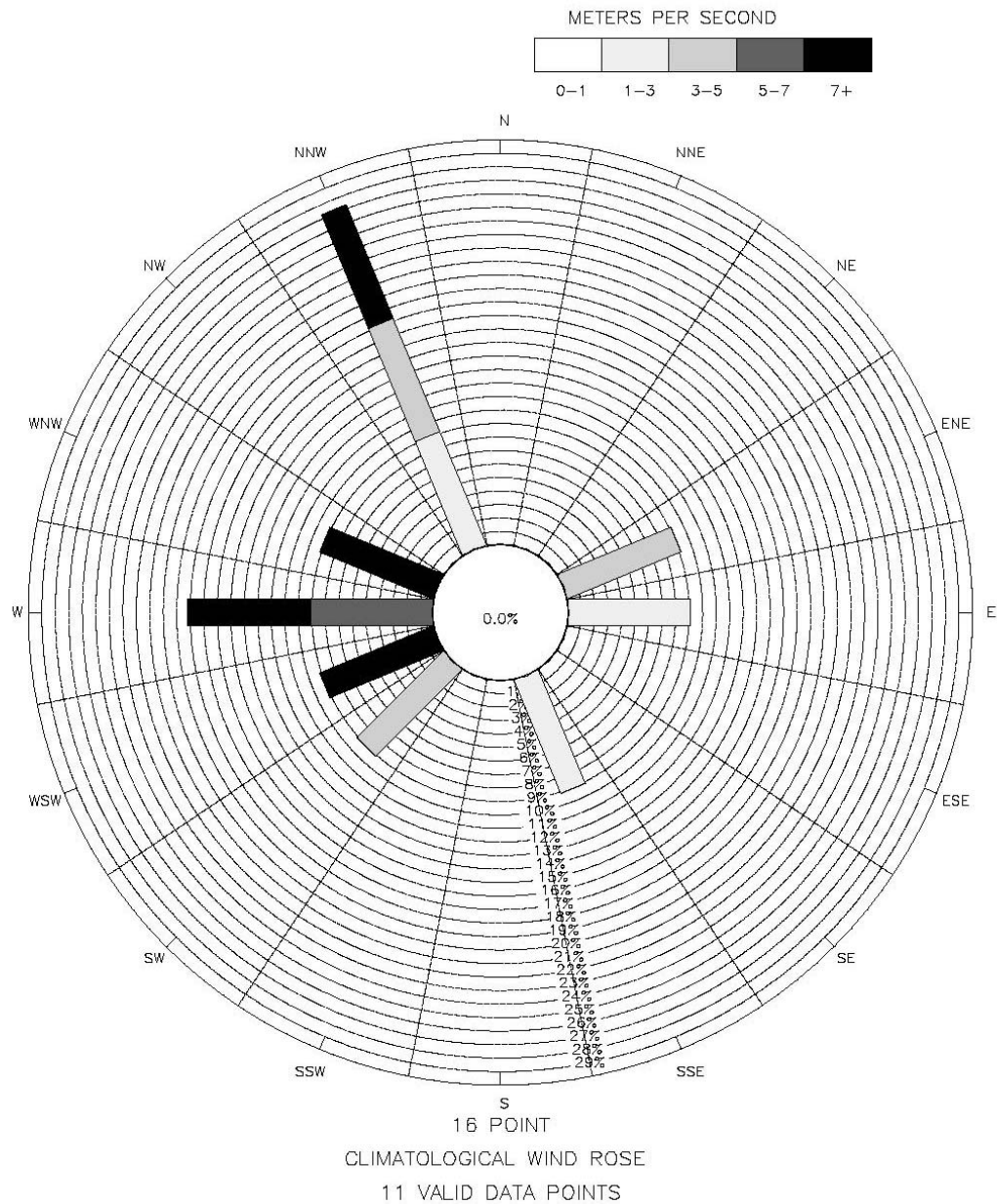


Figure A-2a.
850 mb (pm) Winds for Greensboro (1999–2002)
for Low PM_{2.5} Days in Charlotte (Class 1/Green Days)

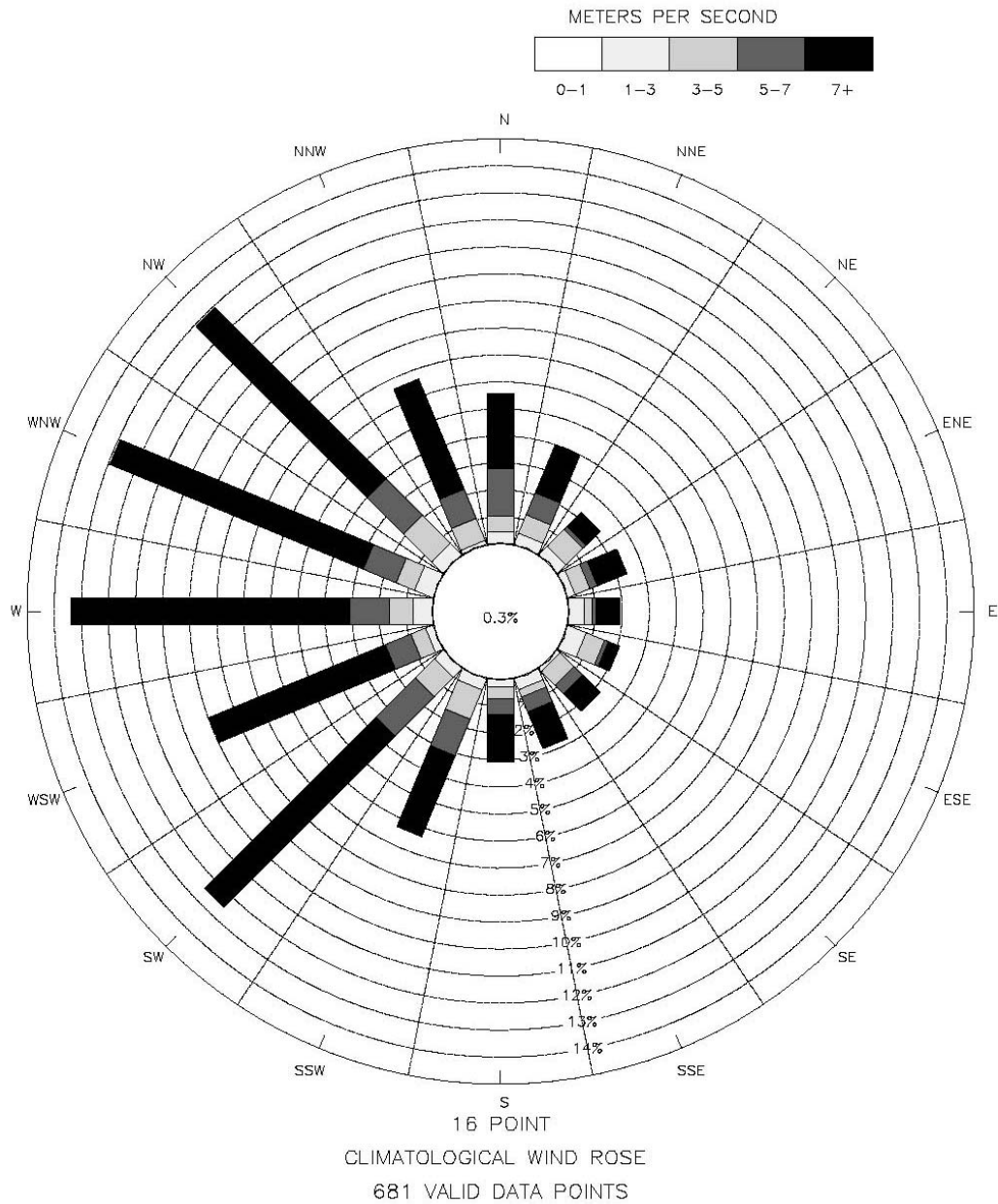


Figure A-2b.
850 mb (pm) Winds for Greensboro (1999–2002)
for Moderate PM_{2.5} Days in Charlotte (Class 2/Yellow Days)

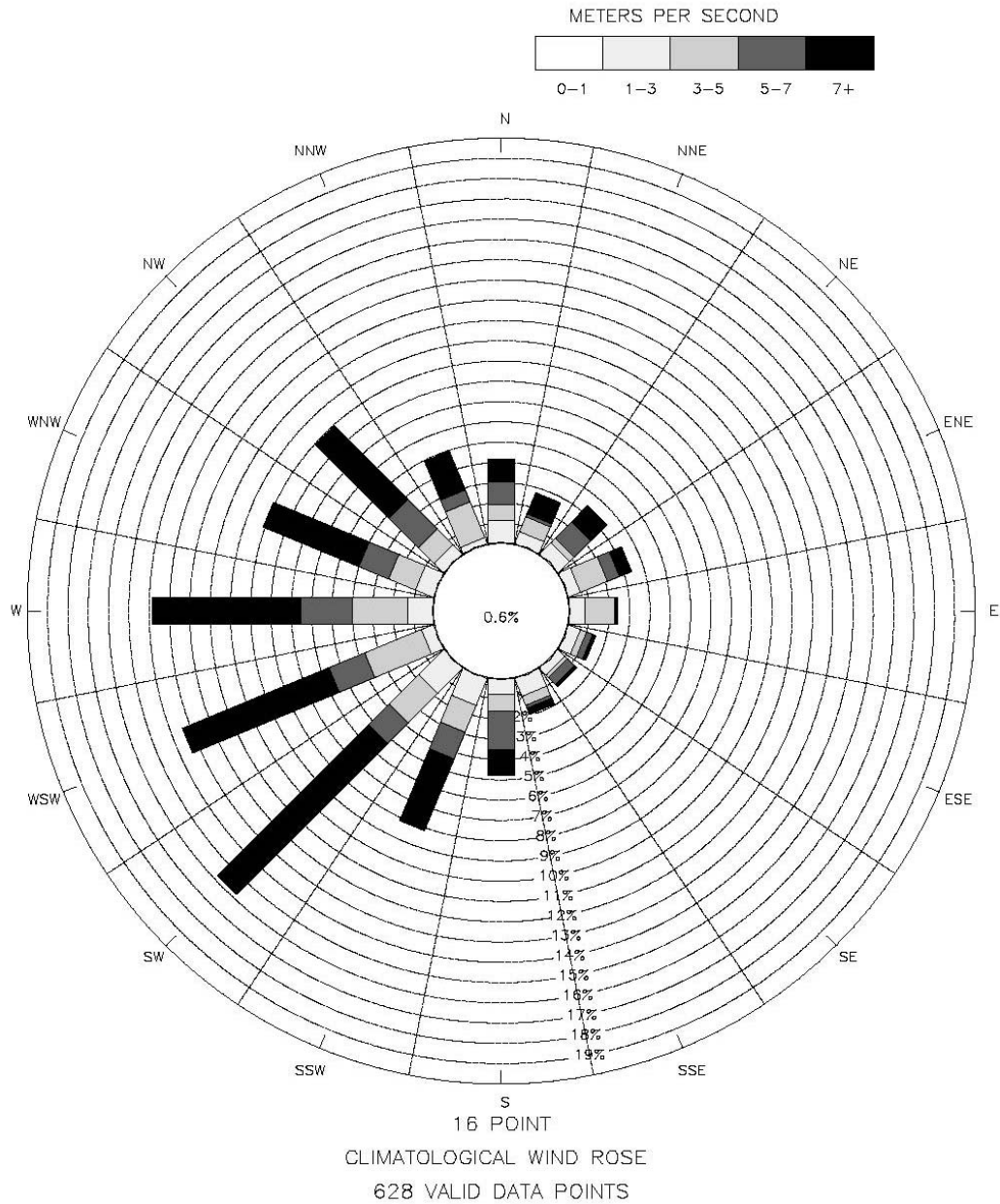


Figure A-2c.
850 mb (pm) Winds for Greensboro (1999–2002)
for High PM_{2.5} Days in Charlotte (Class 3/Orange Days)

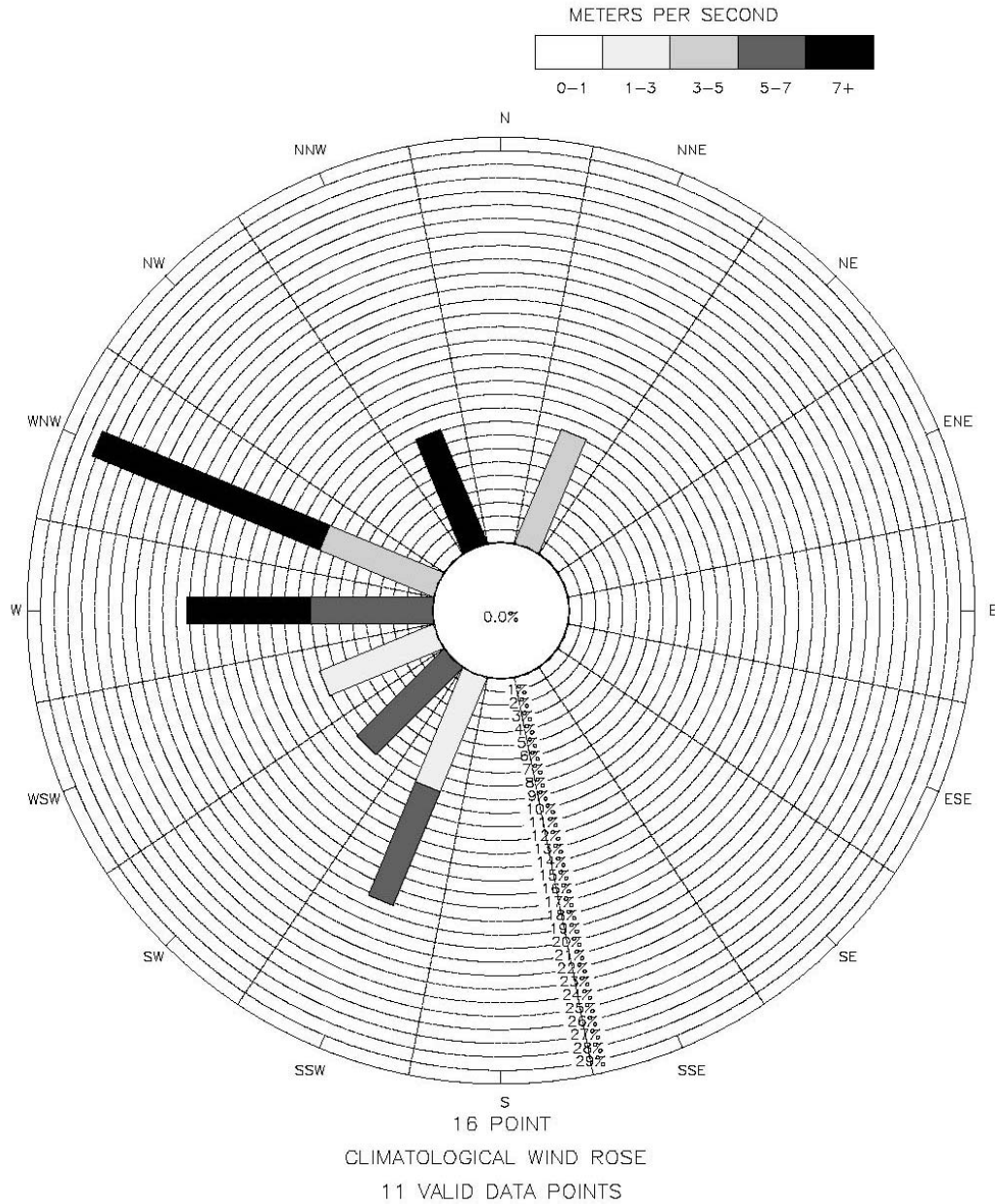


Figure A-3a.
850 mb (am) Winds for Roanoke (1999–2002)
for Low PM_{2.5} Days in Bristol (Class 1/Green Days)

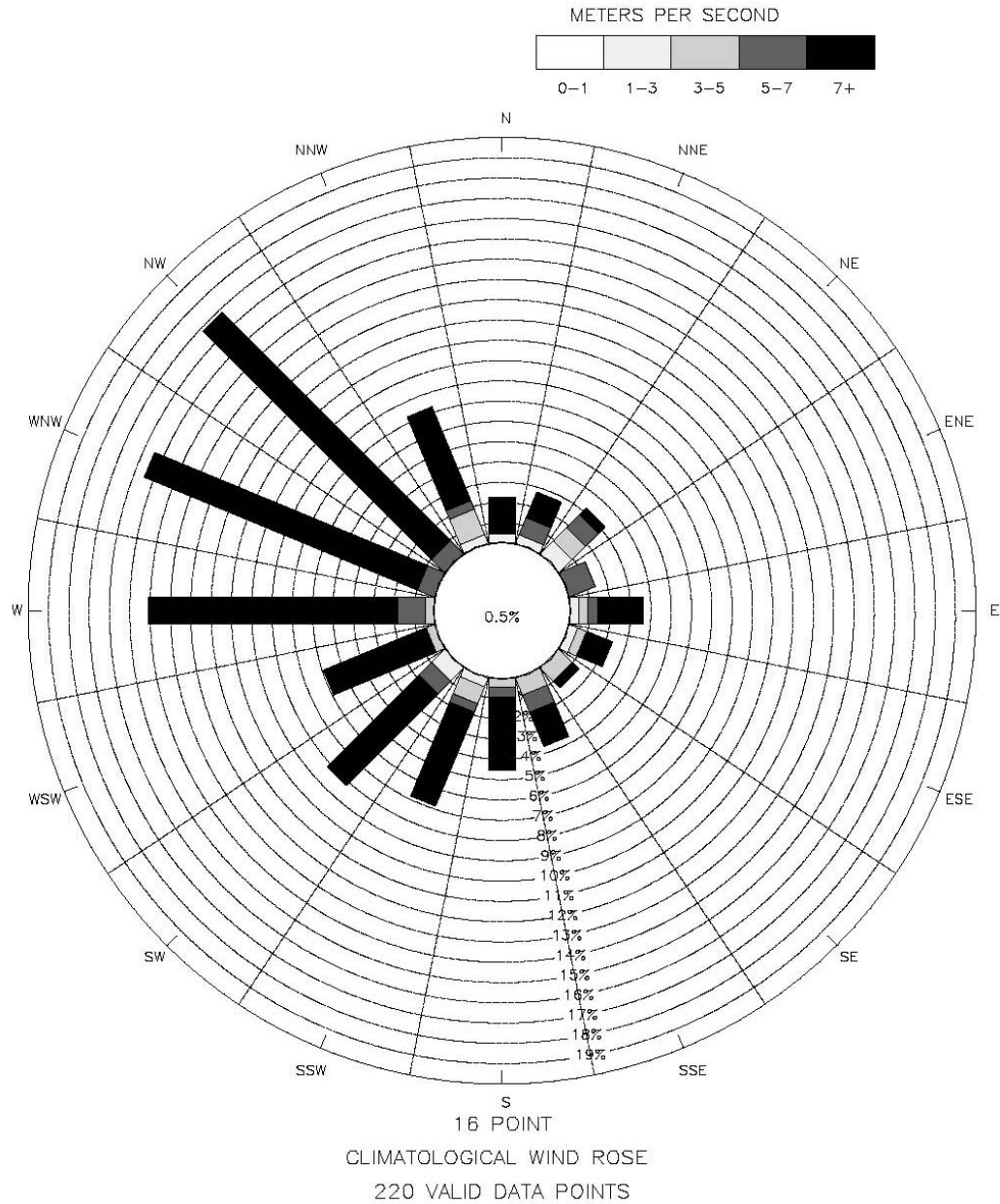


Figure A-3b.
850 mb (am) Winds for Roanoke (1999–2002)
for Moderate PM_{2.5} Days in Bristol (Class 2/Yellow Days)

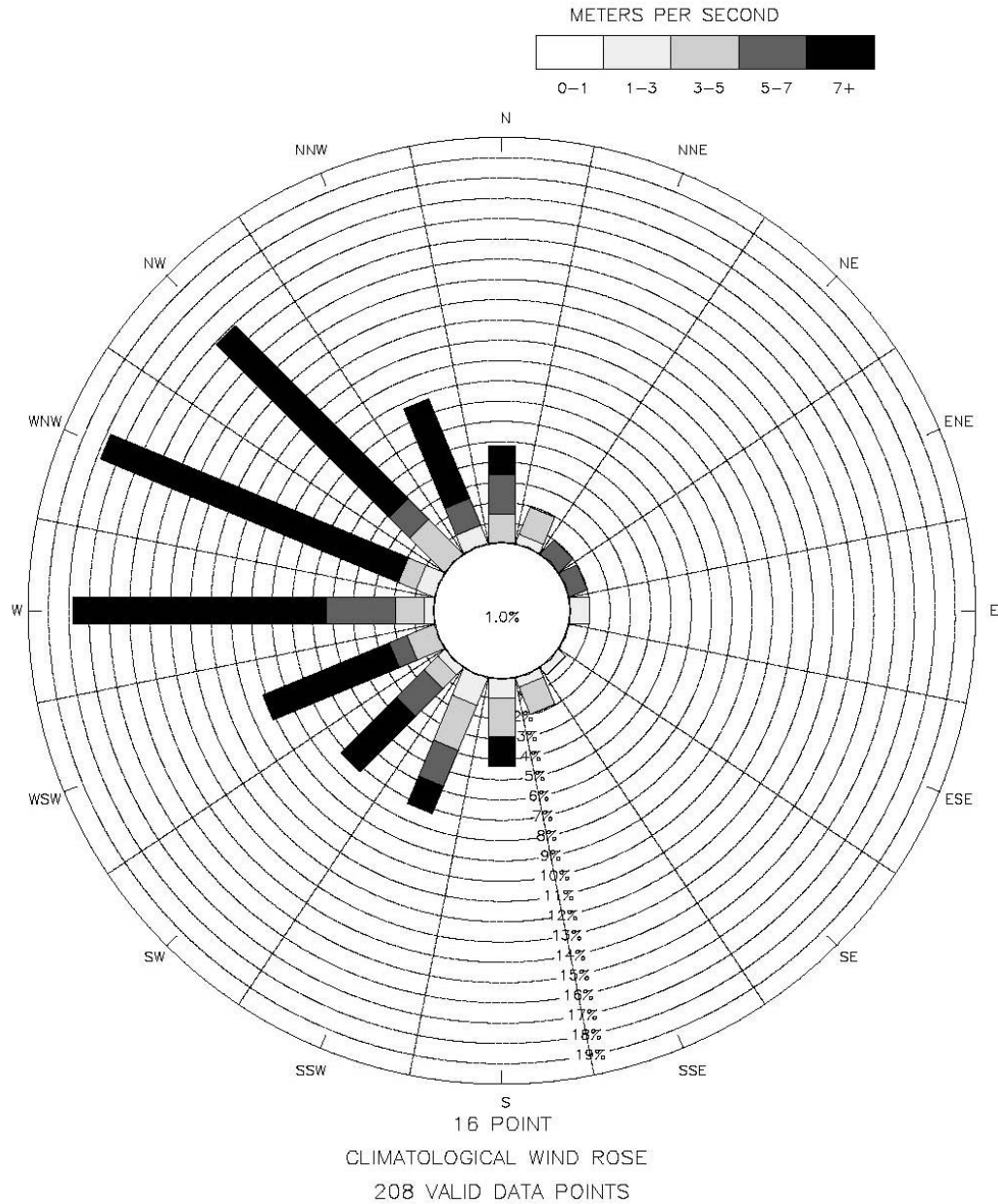


Figure A-3c.
850 mb (am) Winds for Roanoke (1999–2002)
for High PM_{2.5} Days in Bristol (Class 3/Orange Days)

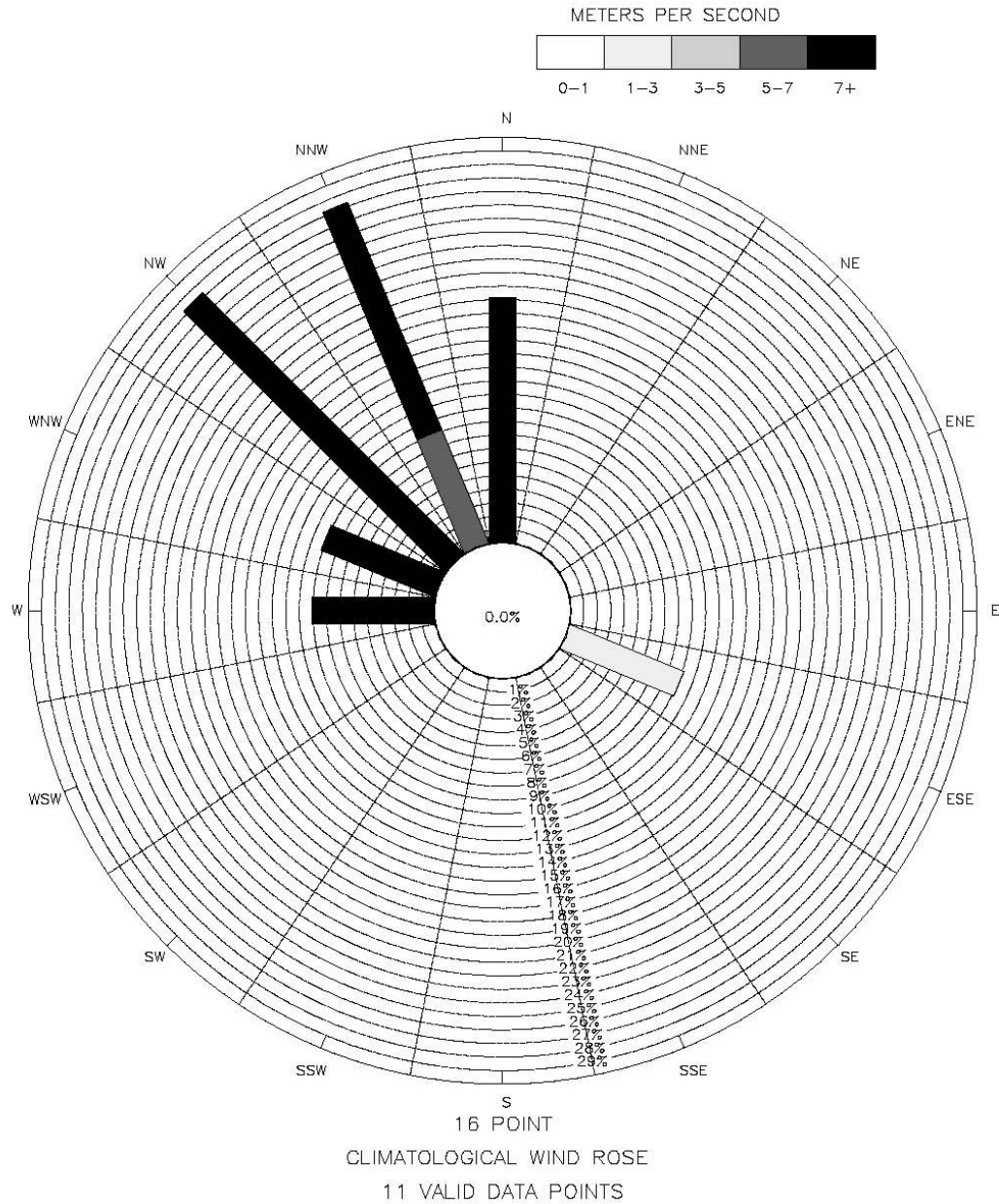


Figure A-4a.
850 mb (pm) Winds for Roanoke (1999–2002)
for Low PM_{2.5} Days in Bristol (Class 1/Green Days)

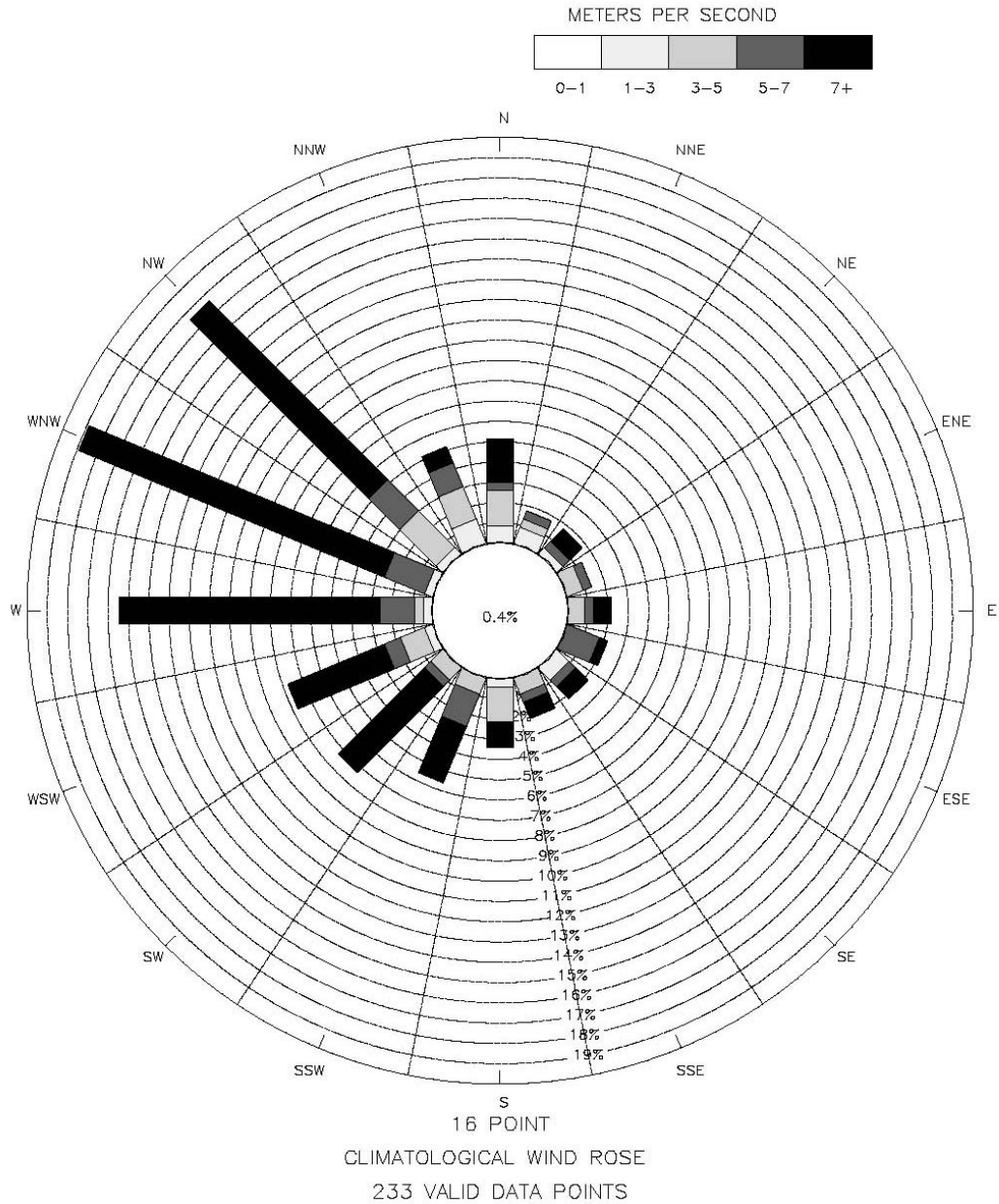


Figure A-4b.
850 mb (pm) Winds for Roanoke (1999–2002)
for Moderate PM_{2.5} Days in Bristol (Class 2/Yellow Days)

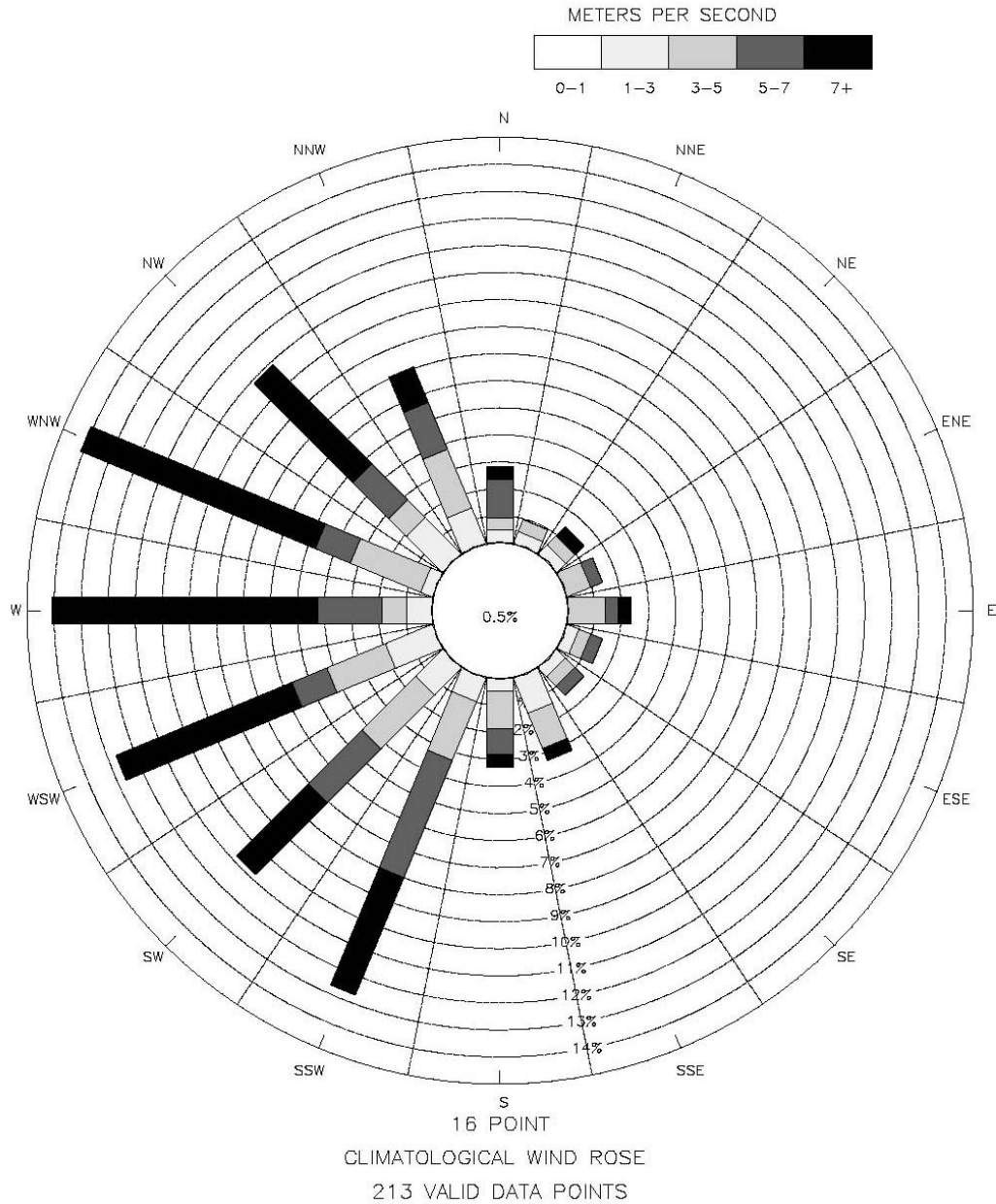


Figure A-4c.
850 mb (pm) Winds for Roanoke (1999–2002)
for High PM_{2.5} Days in Bristol (Class 3/Orange Days)

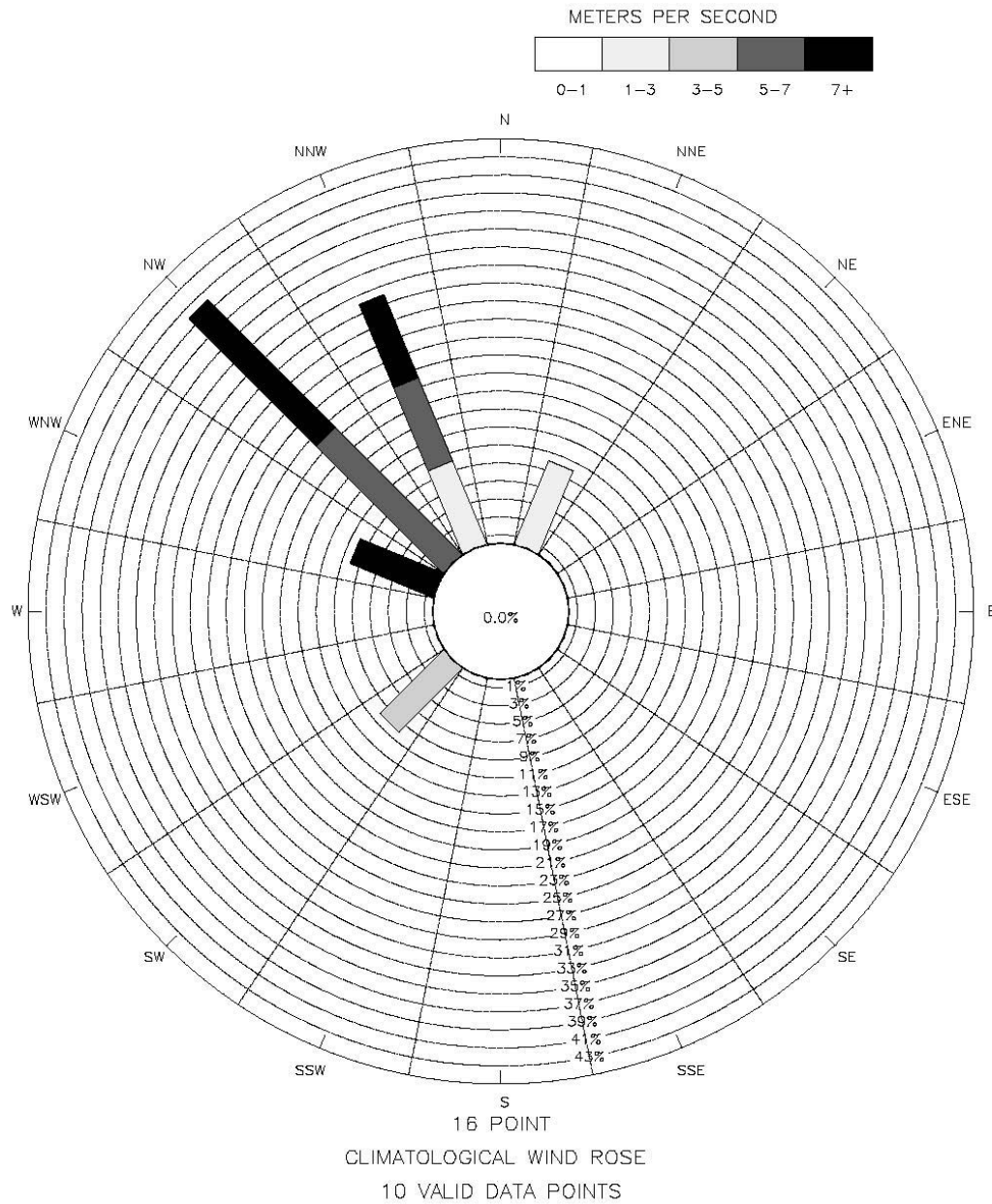


Figure A-5a.
850 mb (am) Winds for Roanoke (1999–2002)
for Low PM_{2.5} Days in Roanoke (Class 1/Green Days)

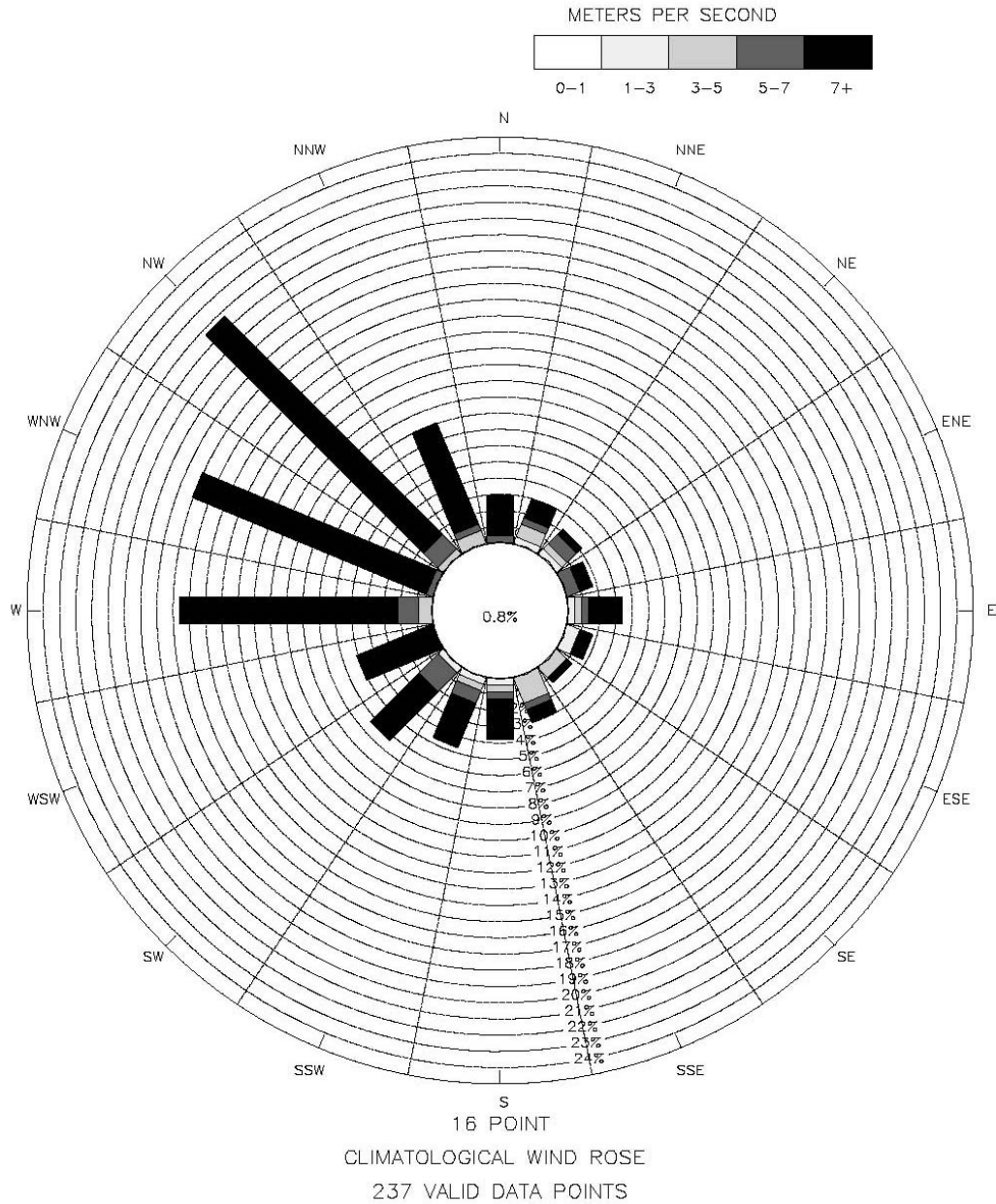


Figure A-5b.
850 mb (am) Winds for Roanoke (1999–2002)
for Moderate PM_{2.5} Days in Roanoke (Class 2/Yellow Days)

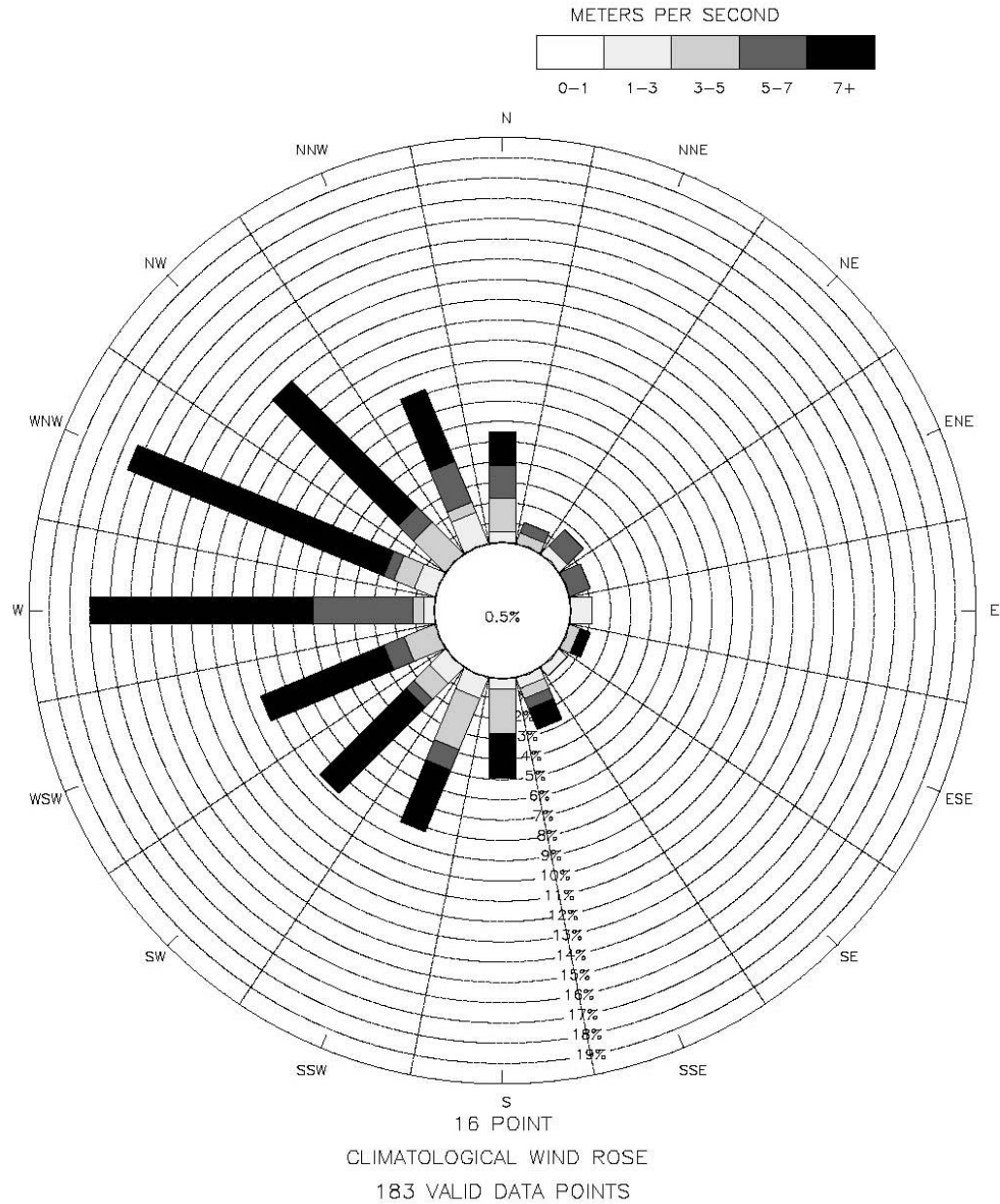


Figure A-6a.
850 mb (pm) Winds for Roanoke (1999–2002)
for Low PM_{2.5} Days in Roanoke (Class 1/Green Days)

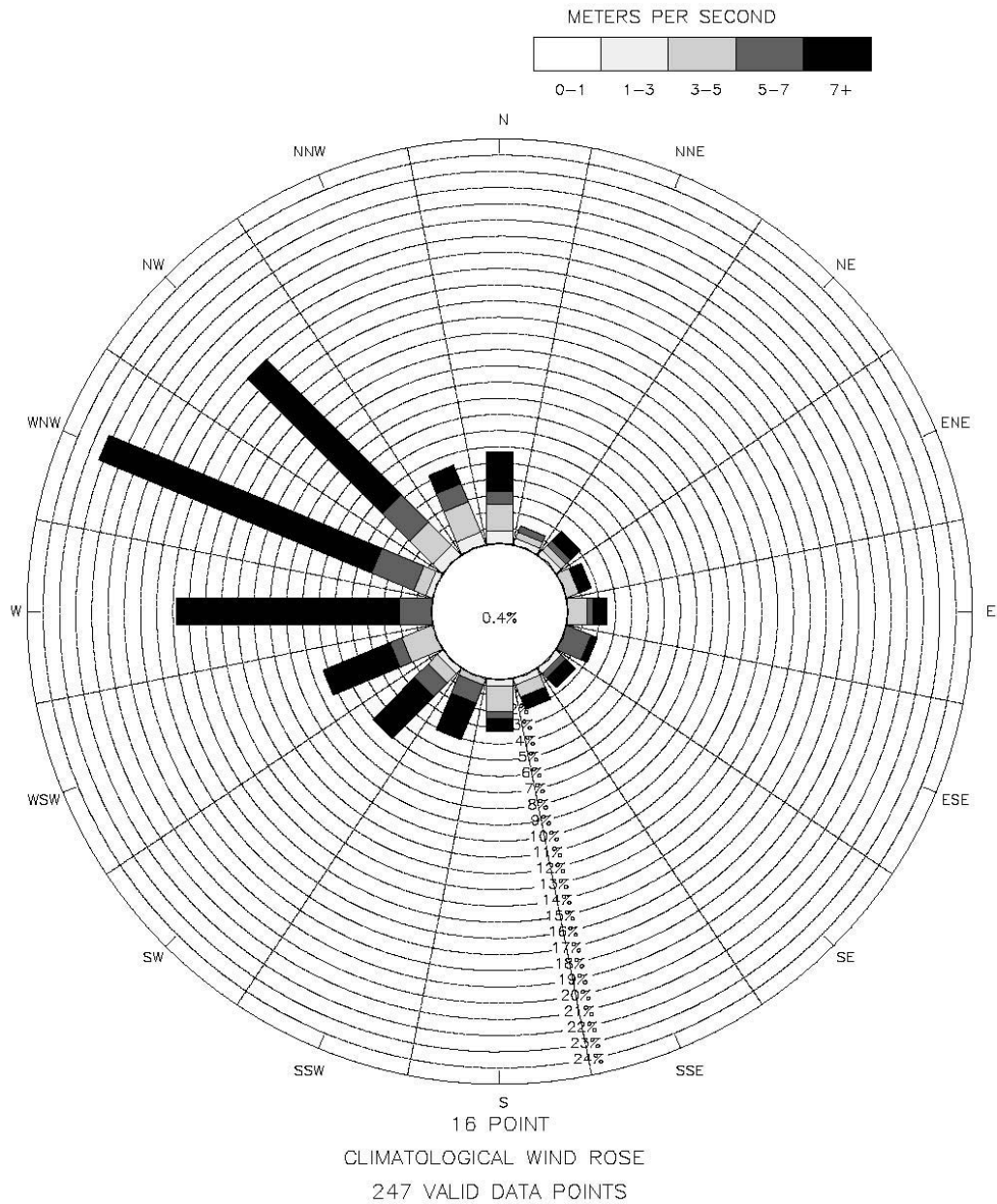


Figure A-6b.
850 mb (pm) Winds for Roanoke (1999–2002)
for Moderate PM_{2.5} Days in Roanoke (Class 2/Yellow Days)

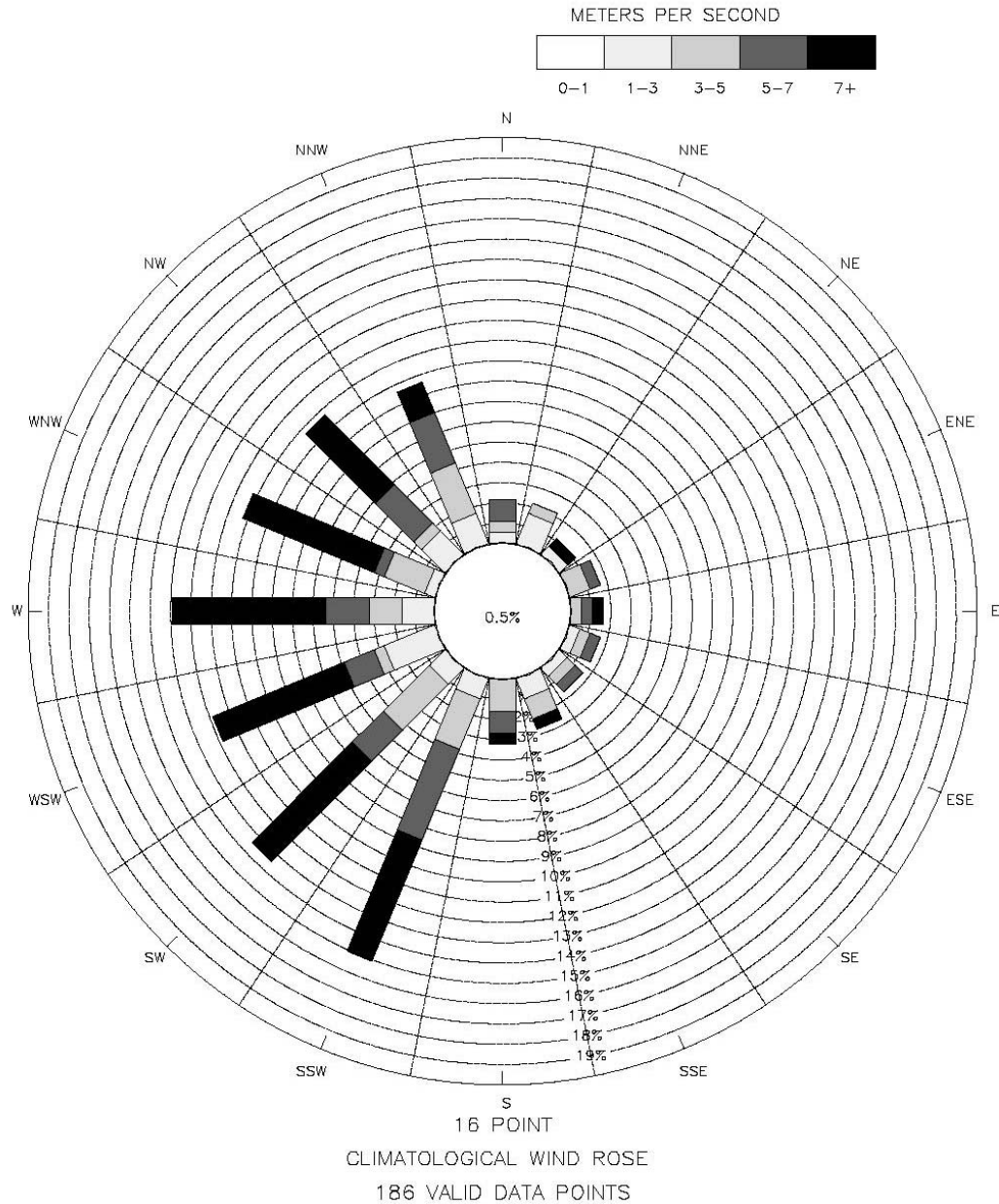


Figure A-7a.
850 mb (am) Winds for Dulles (1999–2002)
for Low PM_{2.5} Days in Richmond (Class 1/Green Days)

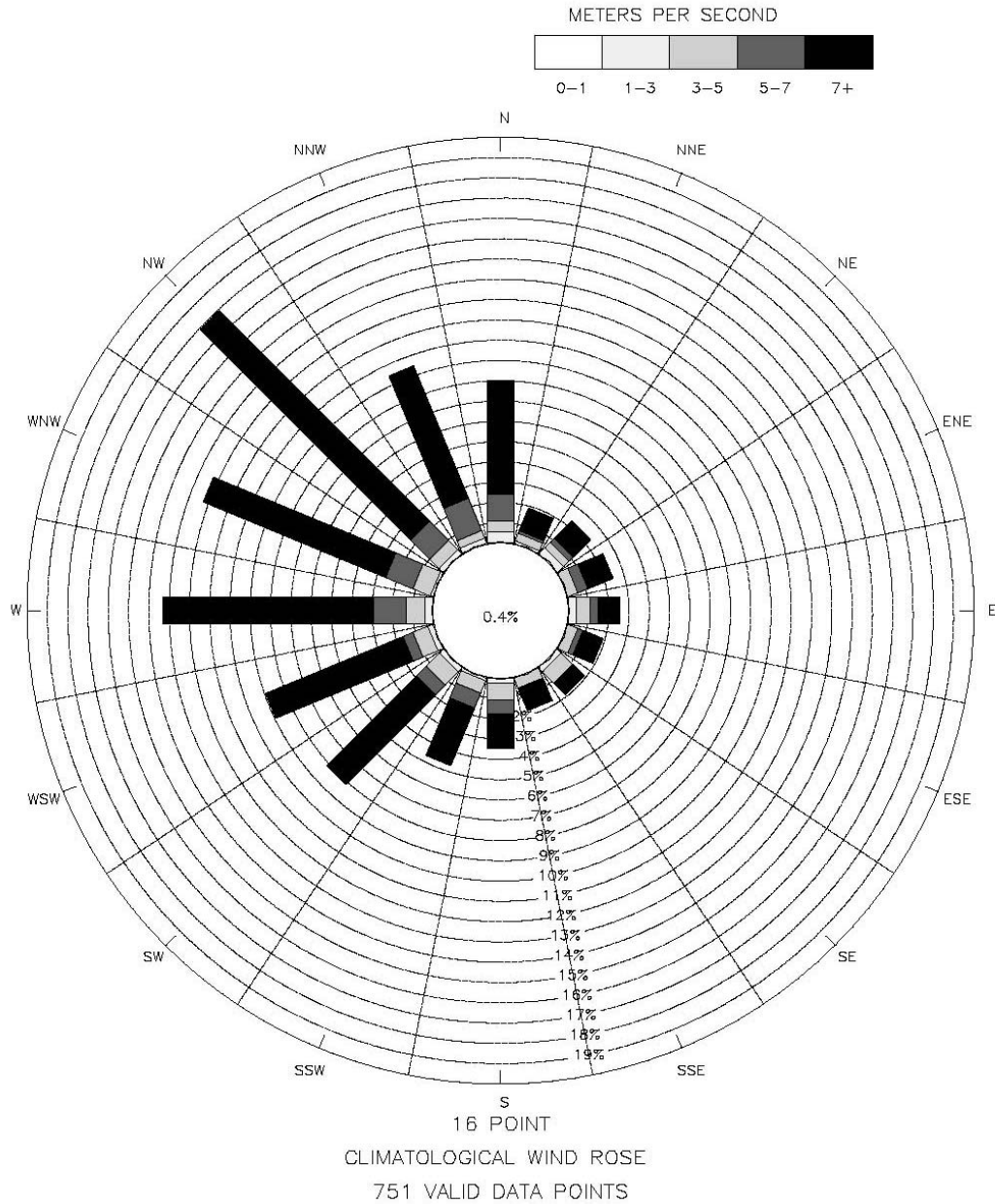


Figure A-7b.
850 mb (am) Winds for Dulles (1999–2002)
for Moderate PM_{2.5} Days in Richmond (Class 2/Yellow Days)

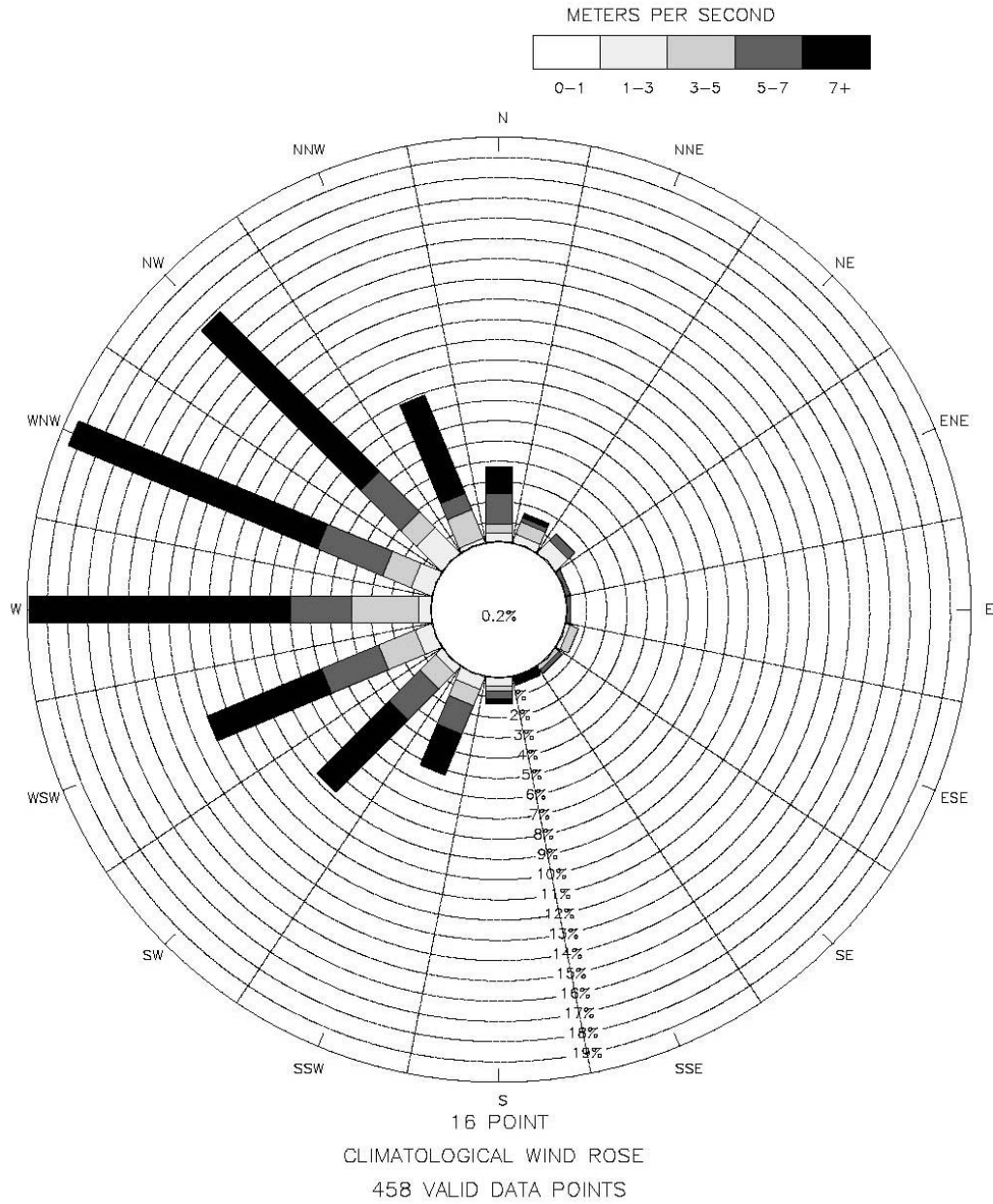


Figure A-8a.
850 mb (pm) Winds for Dulles (1999–2002)
for Low PM_{2.5} Days in Richmond (Class 1/Green Days)

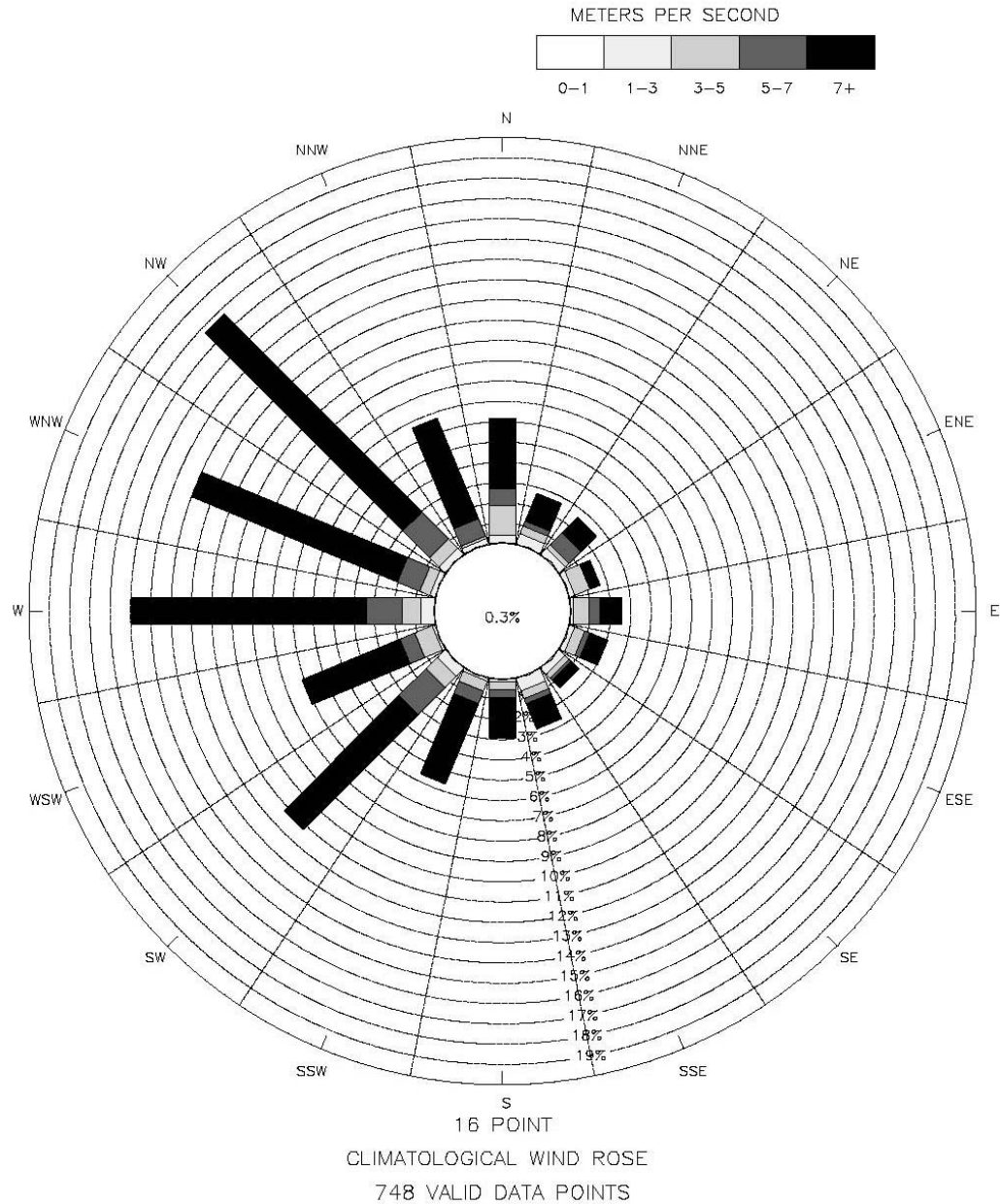


Figure A-8b.
850 mb (pm) Winds for Dulles (1999–2002)
for Moderate PM_{2.5} Days in Richmond (Class 2/Yellow Days)

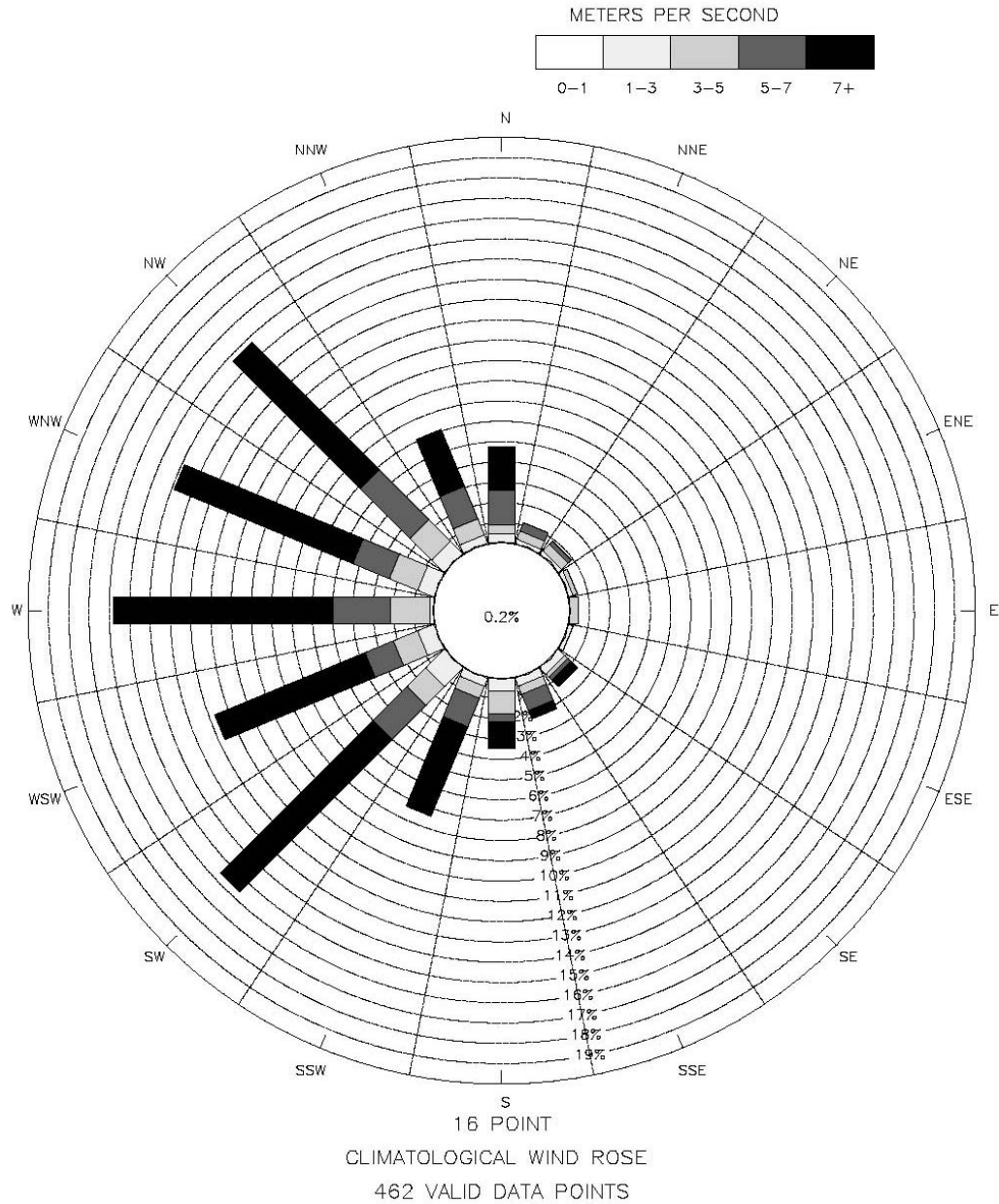


Figure A-8c.
850 mb (pm) Winds for Dulles (1999–2002)
for High PM_{2.5} Days in Richmond (Class 3/Orange Days)

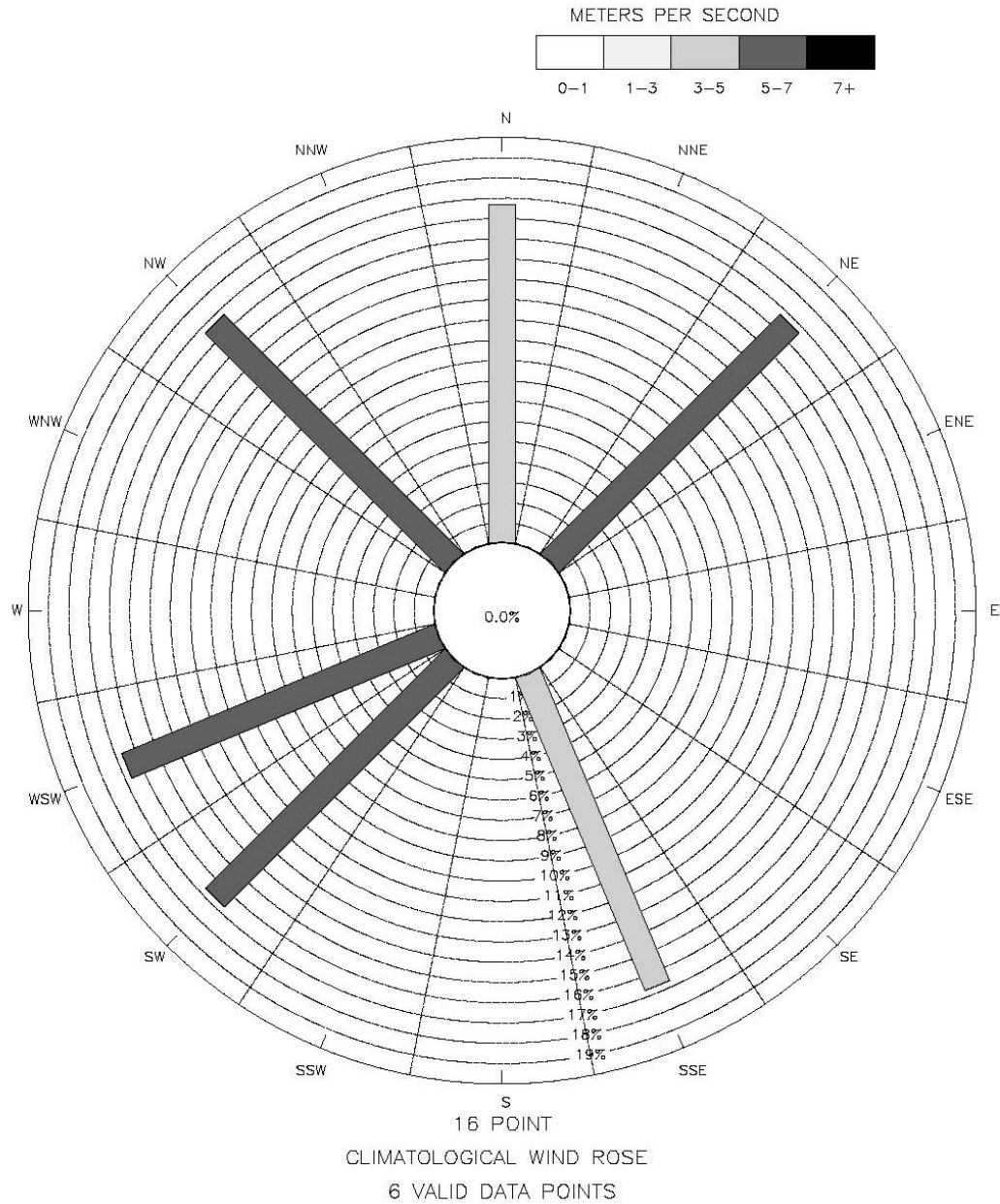


Figure A-9a.
850 mb (am) Winds for Dulles (1999–2002)
for Low PM_{2.5} Days in Washington, D.C. (Class 1/Green Days)

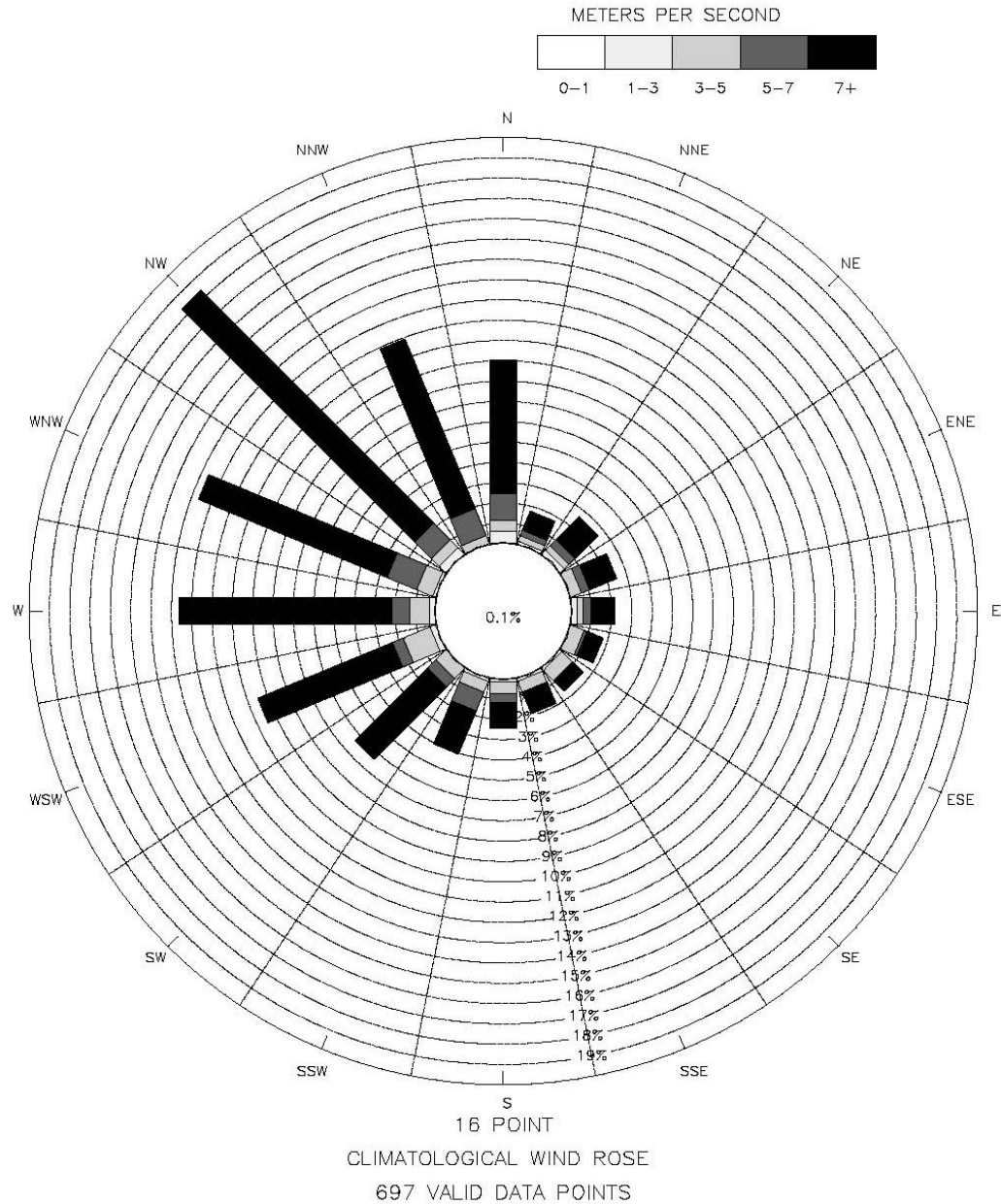


Figure A-9b.
850 mb (am) Winds for Dulles (1999–2002)
for Moderate PM_{2.5} Days in Washington, D.C. (Class 2/Yellow Days)

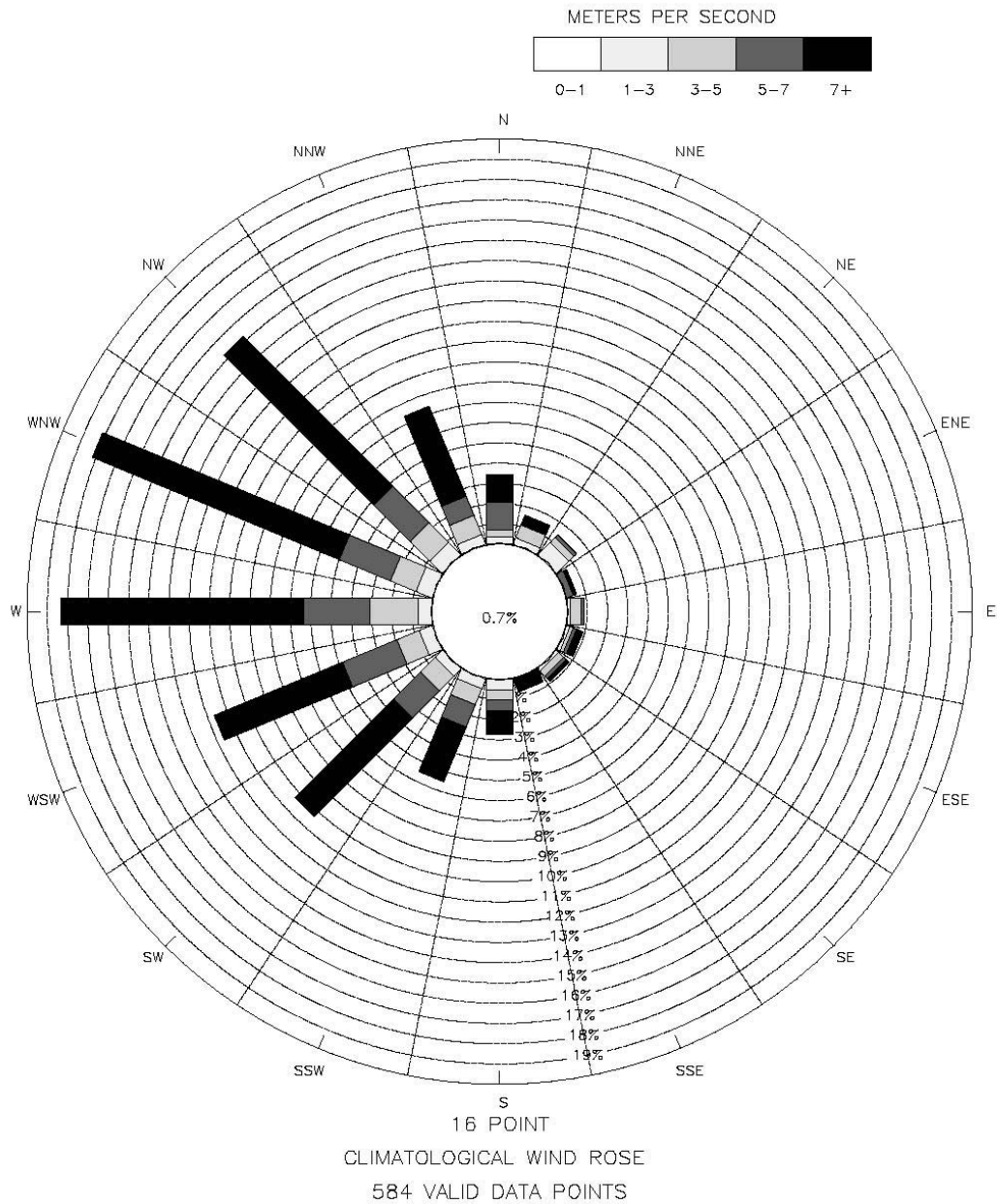


Figure A-9c.
850 mb (am) Winds for Dulles (1999–2002)
for High PM_{2.5} Days in Washington, D.C. (Class 3/Orange Days)

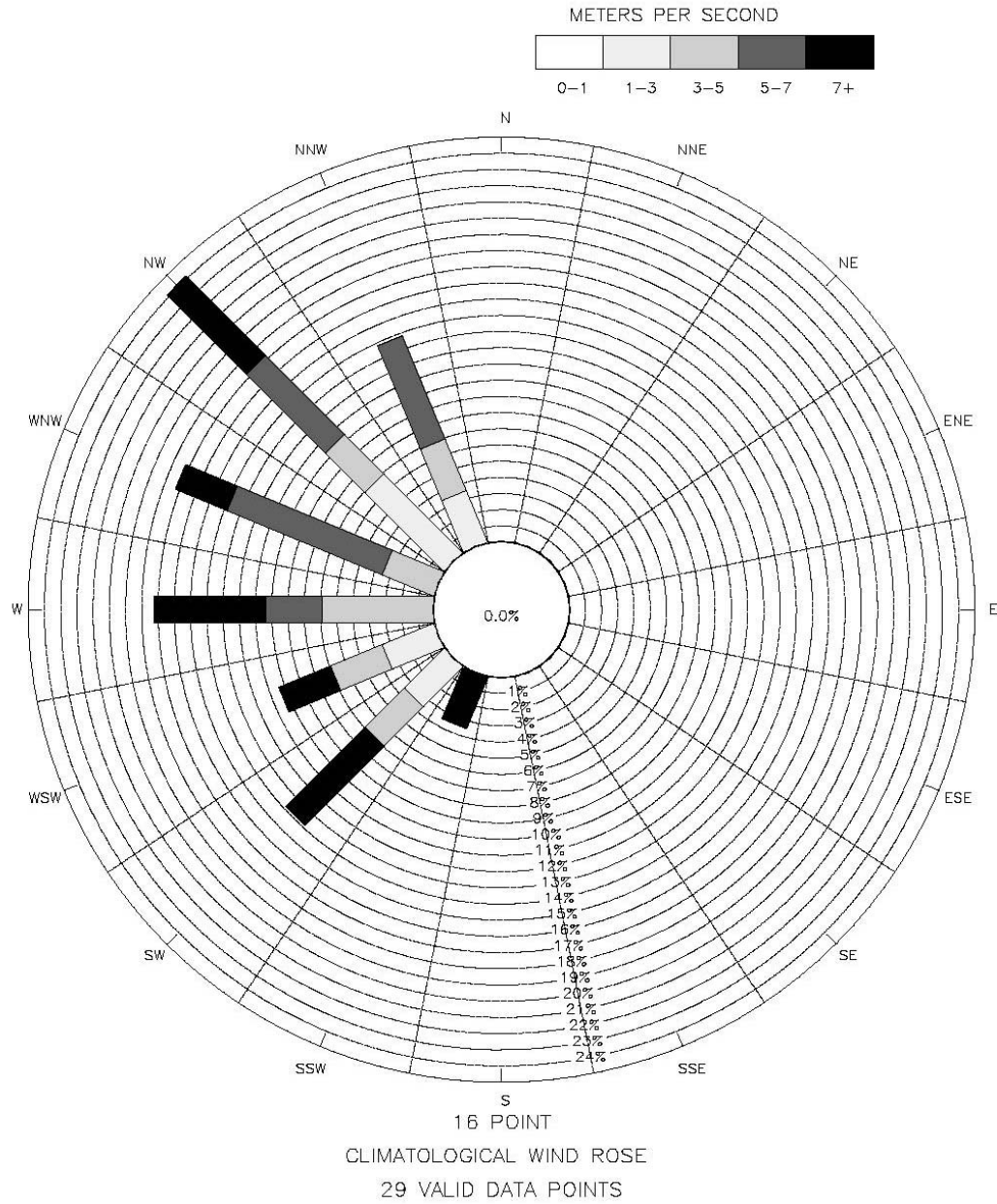


Figure A-10a.
850 mb (pm) Winds for Dulles (1999–2002)
for Low PM_{2.5} Days in Washington, D.C. (Class 1/Green Days)

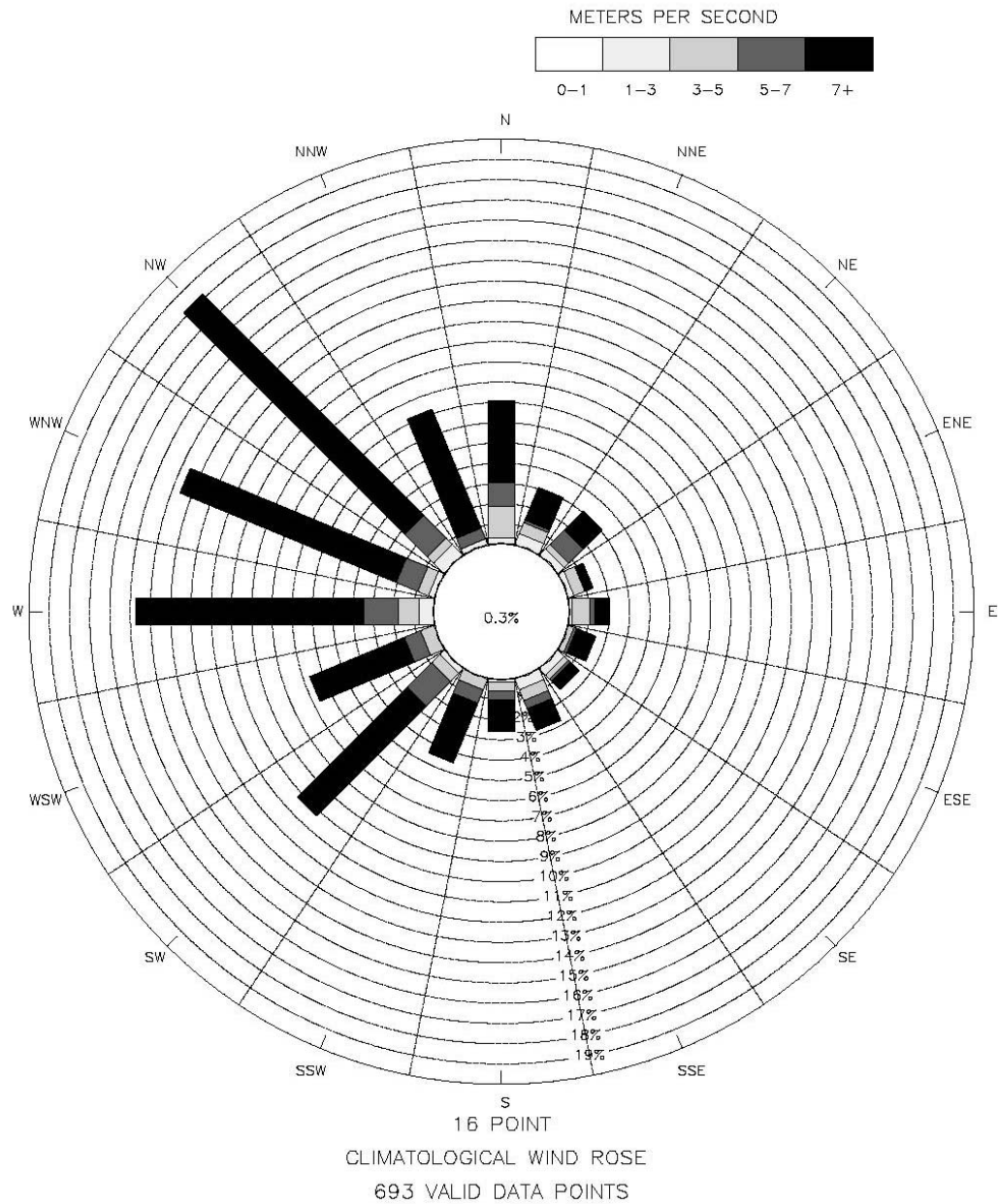


Figure A-10b.
850 mb (pm) Winds for Dulles (1999–2002)
for Moderate PM_{2.5} Days in Washington, D.C. (Class 2/Yellow Days)

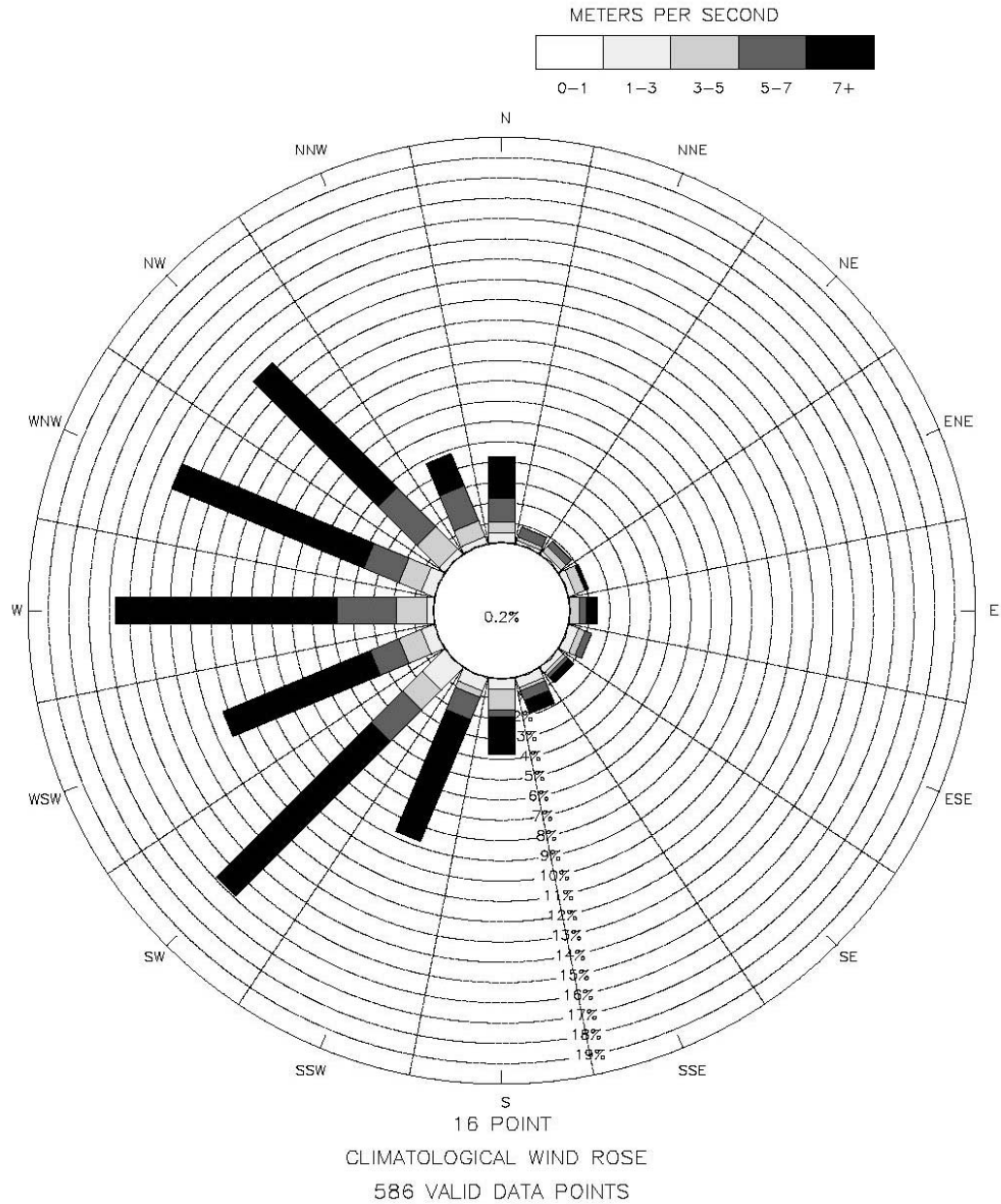


Figure A-10c.
850 mb (pm) Winds for Dulles (1999–2002)
for High PM_{2.5} Days in Washington, D.C. (Class 3/Orange Days)

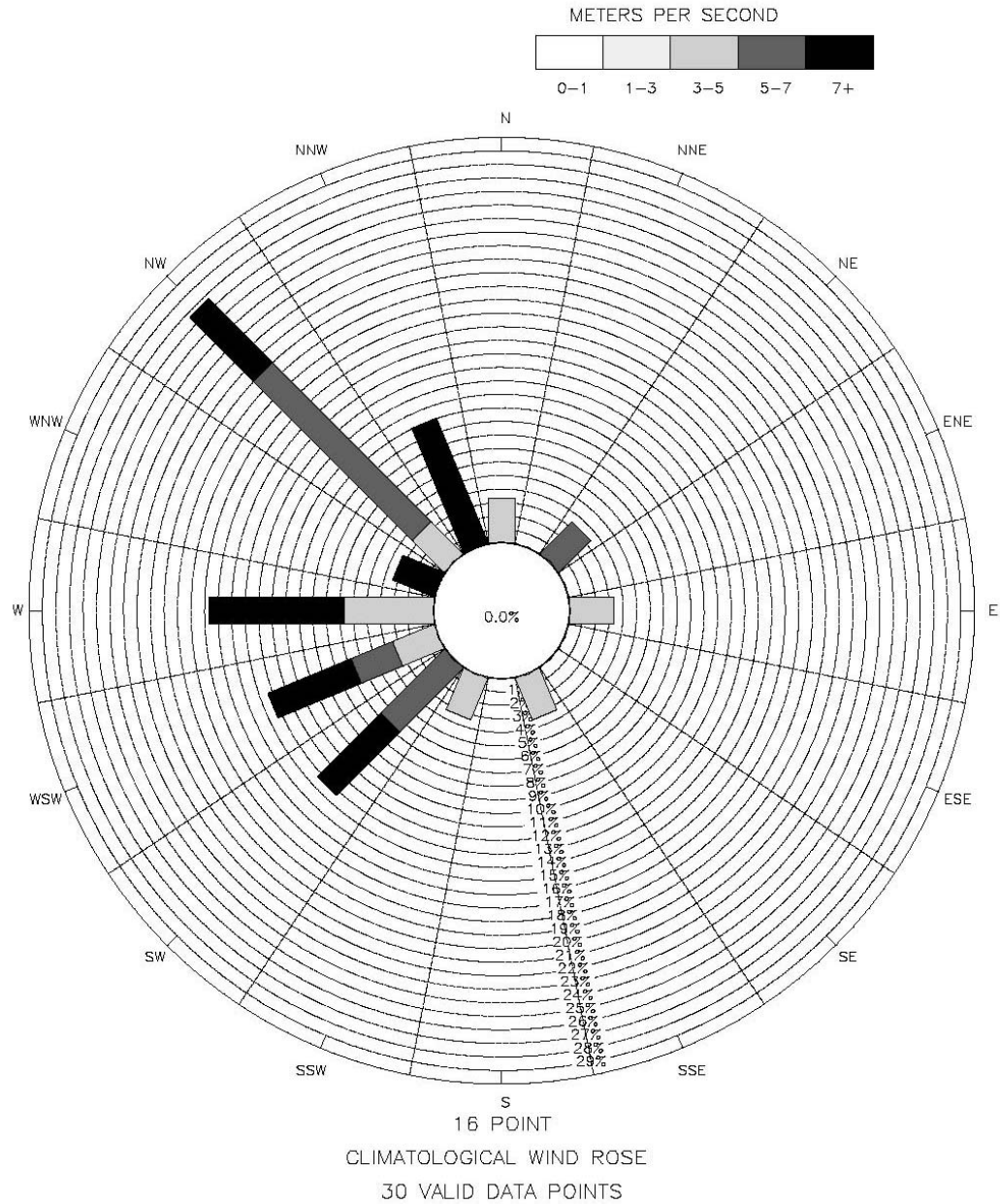


Figure A-11a.
850 mb (am) Winds for Dulles (1999–2002)
for Low PM_{2.5} Days in Baltimore (Class 1/Green Days)

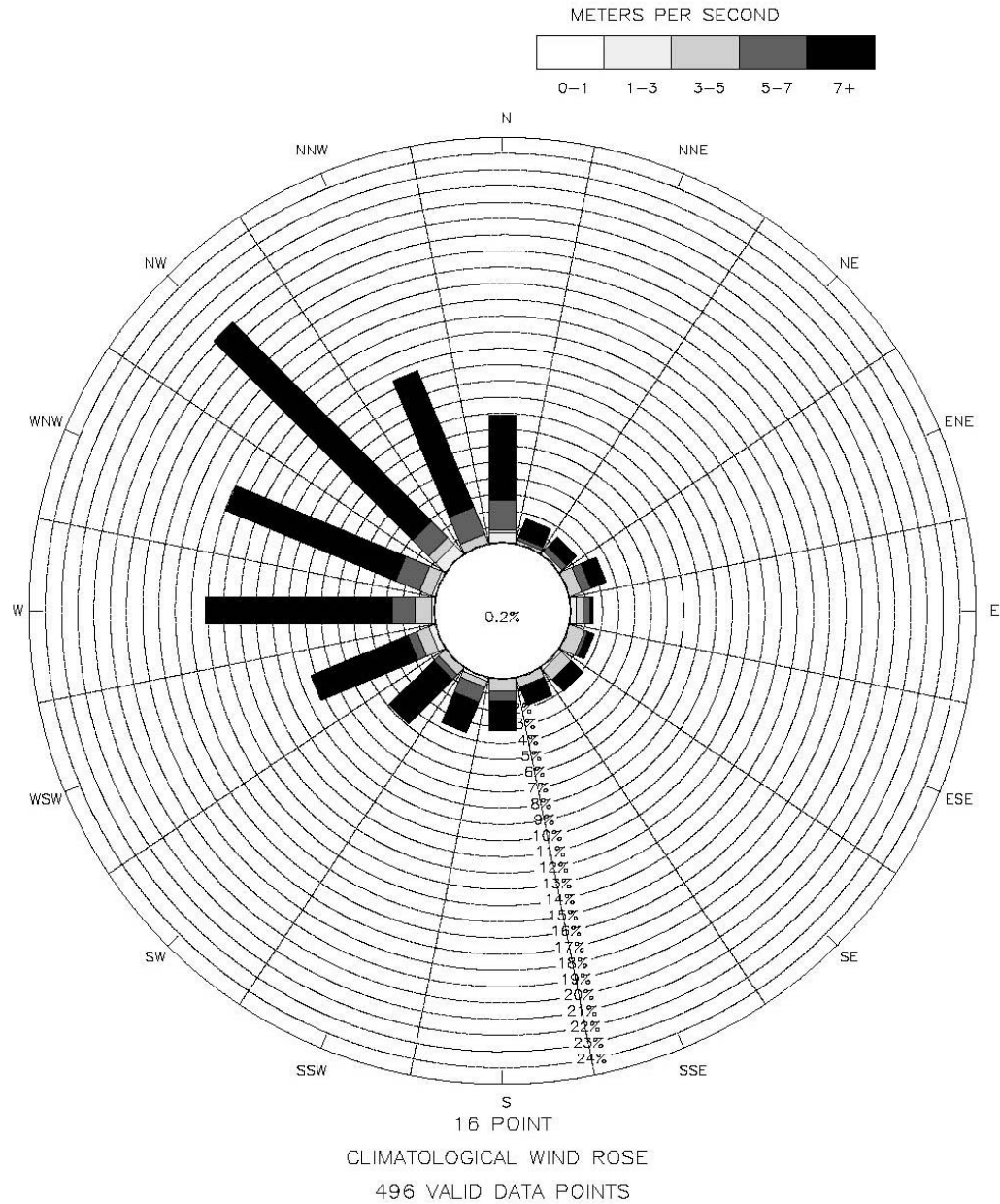


Figure A-11b.
850 mb (am) Winds for Dulles (1999–2002)
for Moderate PM_{2.5} Days in Baltimore (Class 2/Yellow Days)

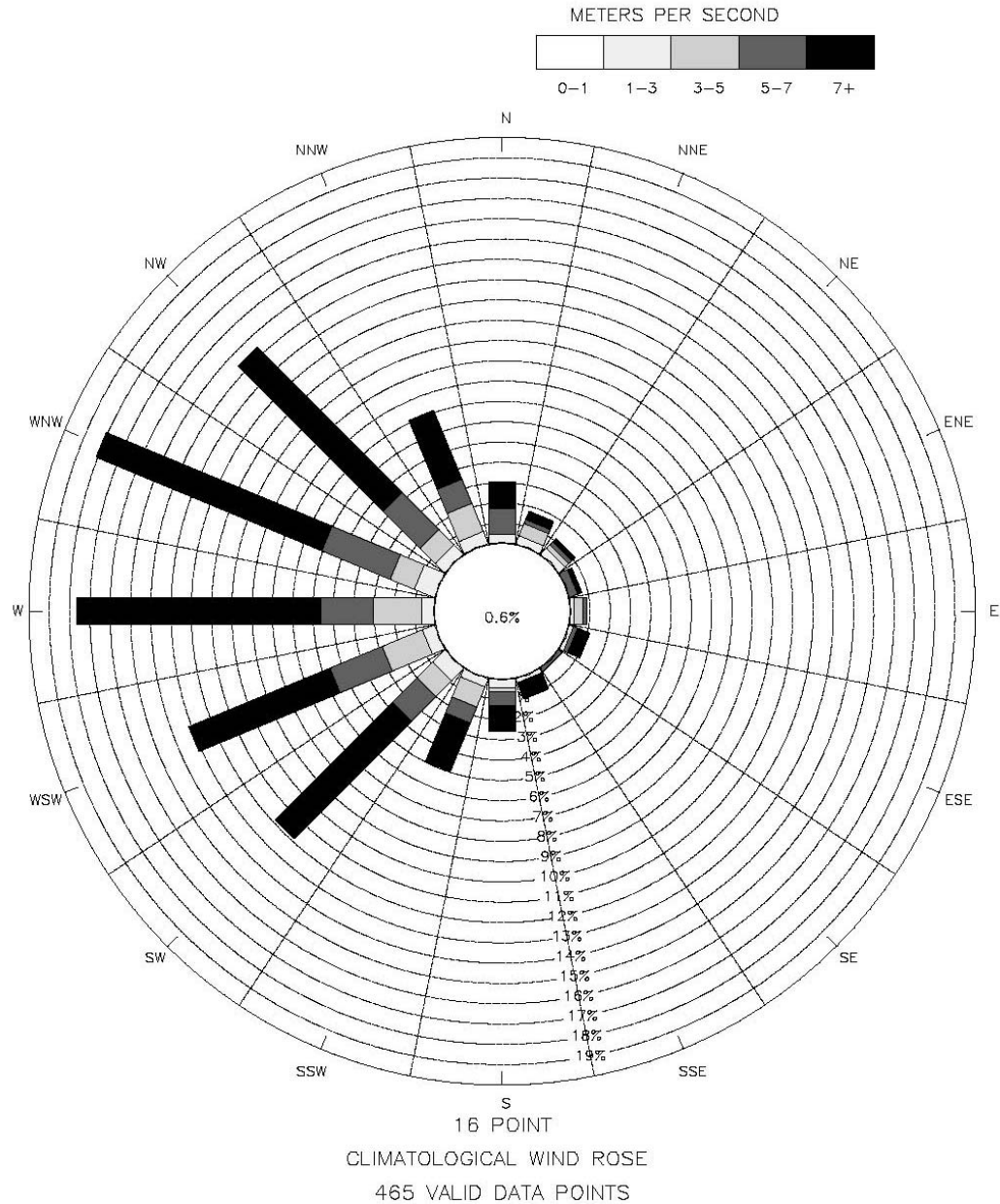


Figure A-11c.
850 mb (am) Winds for Dulles (1999–2002)
for High PM_{2.5} Days in Baltimore (Class 3/Orange Days)

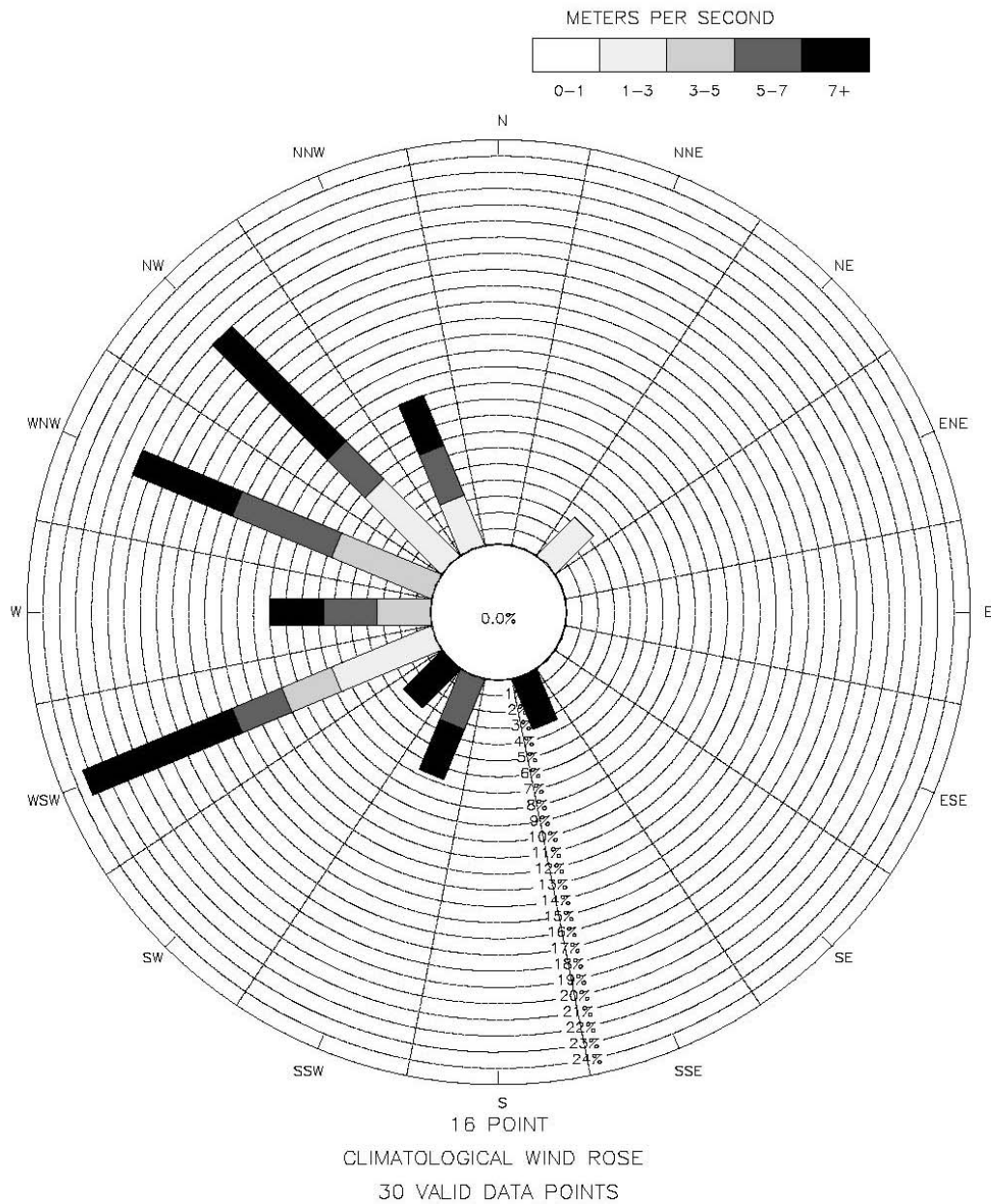


Figure A-11c. 850 mb (am) winds for Dulles (1999 – 2002)
 for high pm_{2.5} days in Baltimore (class 3/orange days).

Figure A-12a.
850 mb (pm) Winds for Dulles (1999–2002)
for Low PM_{2.5} Days in Baltimore (Class 1/Green Days)

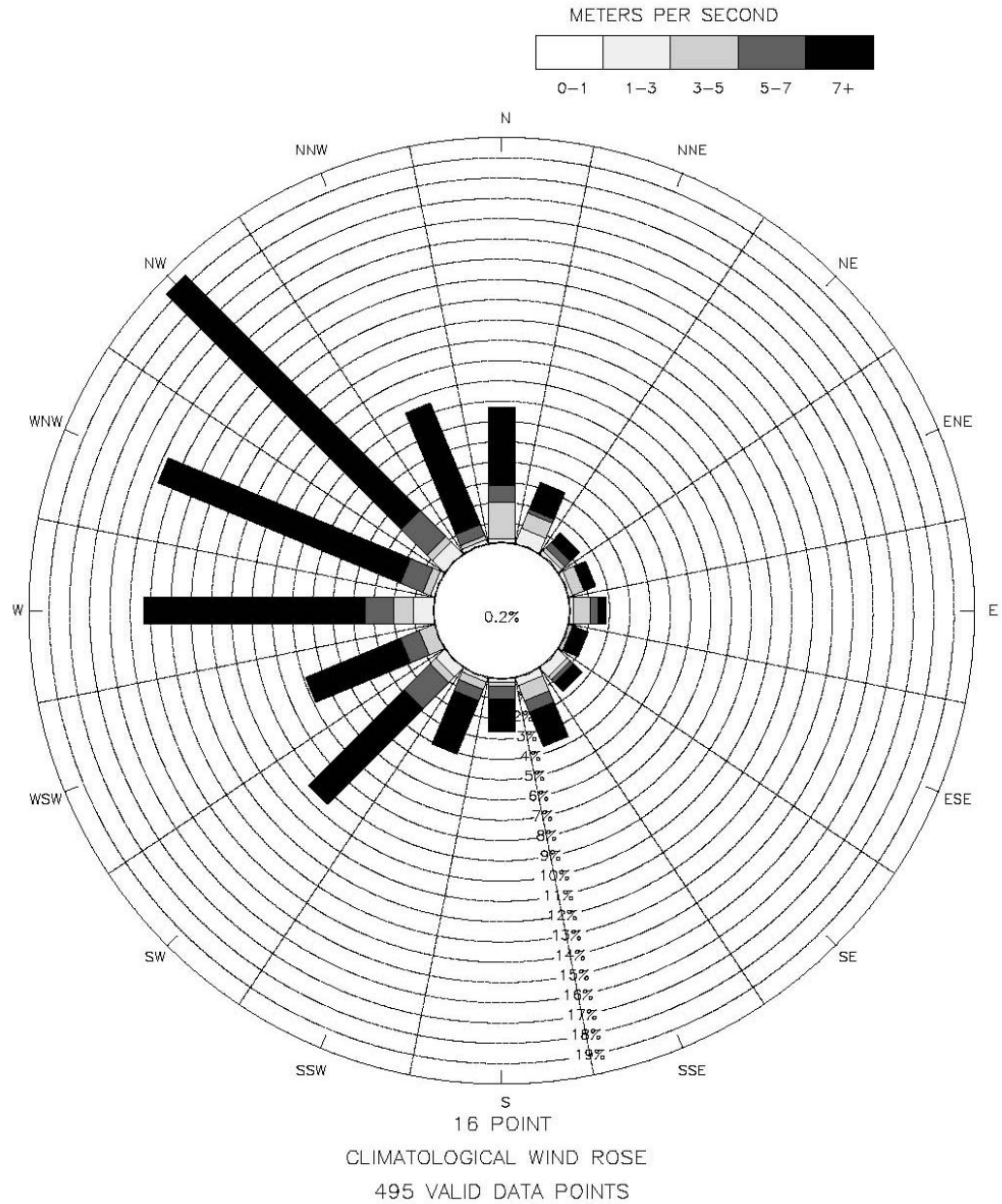


Figure A-12b.
850 mb (pm) Winds for Dulles (1999–2002)
for Moderate PM_{2.5} Days in Baltimore (Class 2/Yellow Days)

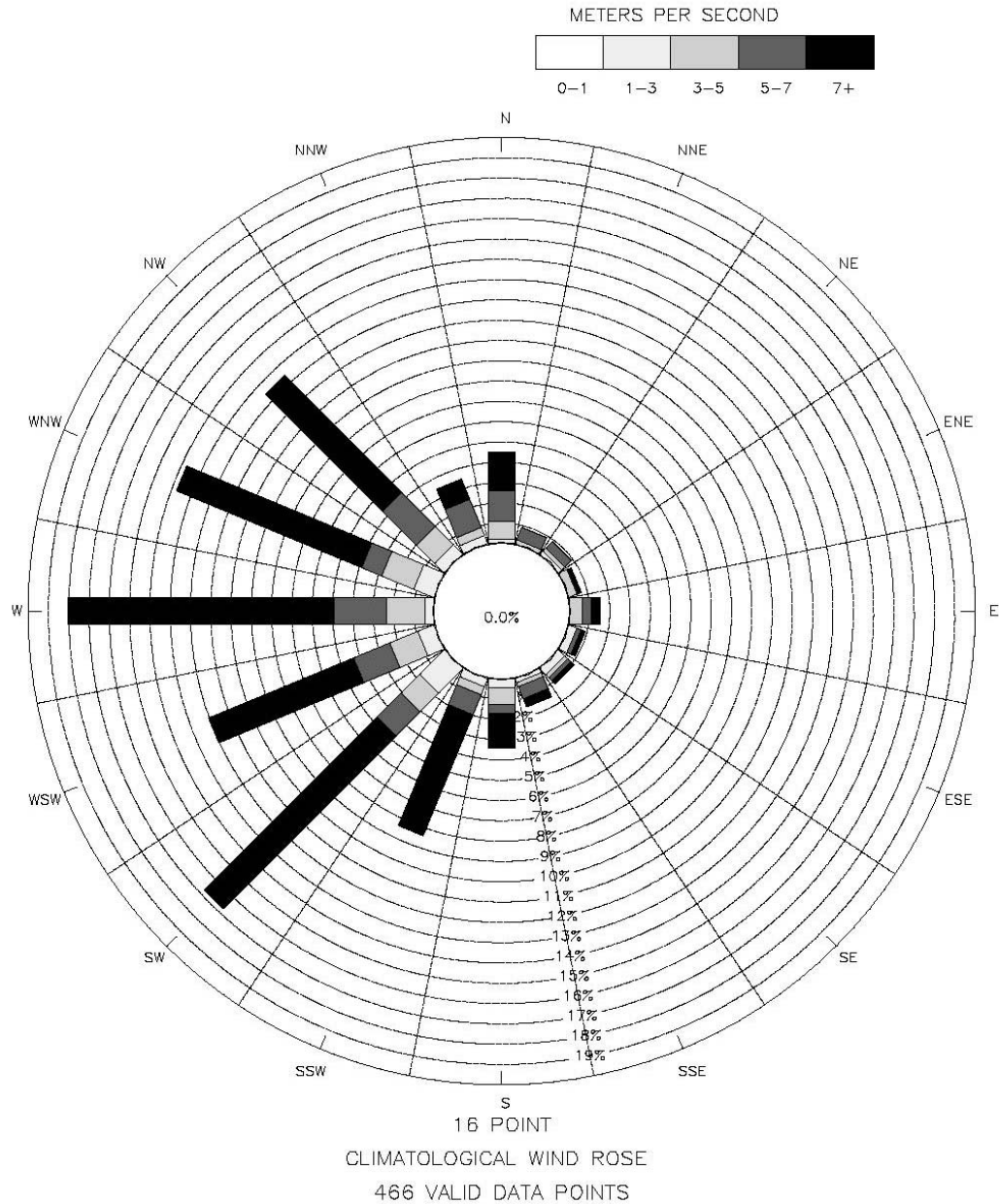


Figure A-12c.
850 mb (pm) Winds for Dulles (1999–2002)
for High PM_{2.5} Days in Baltimore (Class 3/Orange Days)

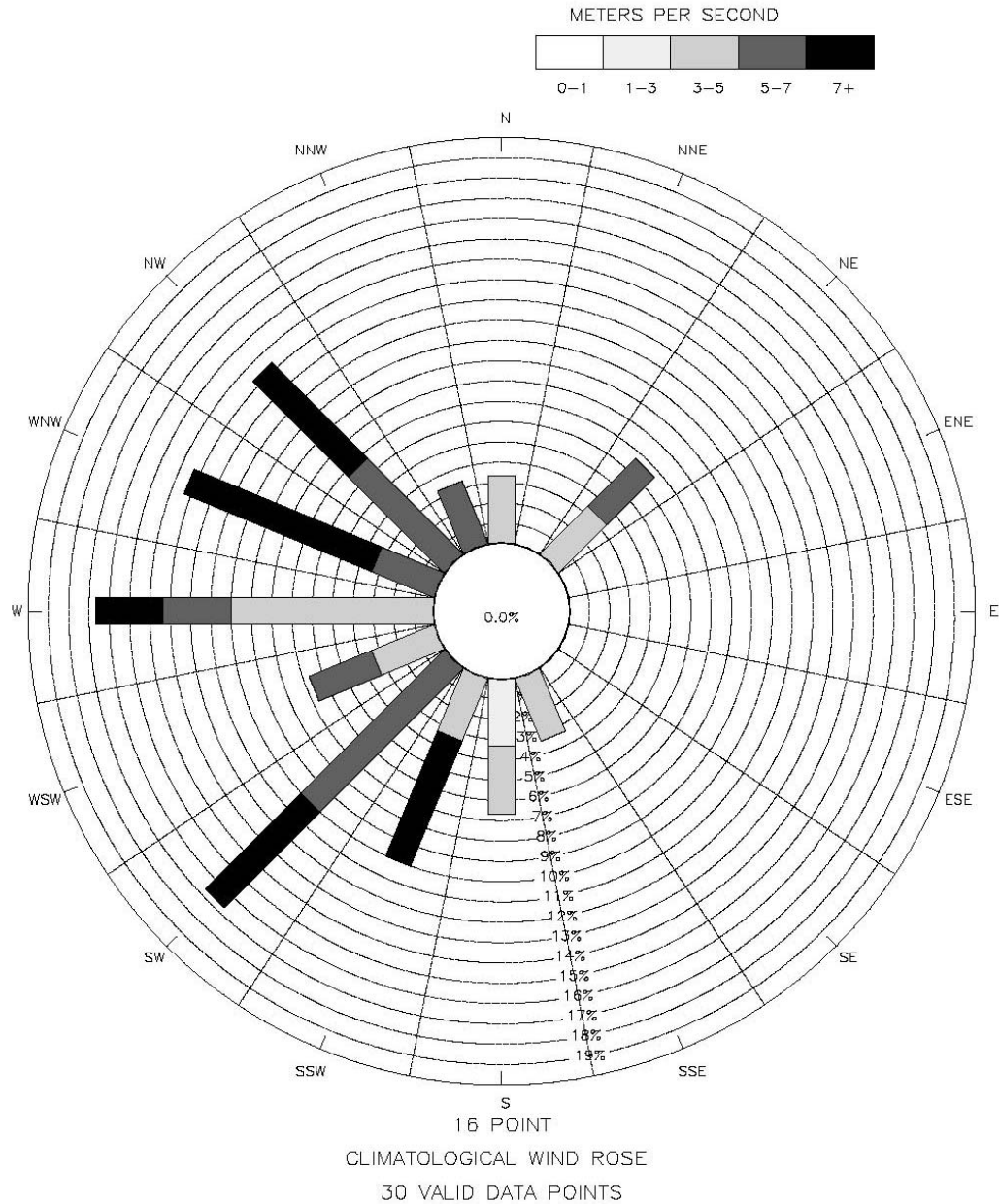


Figure A-13a.
850 mb (am) Winds for Dulles (1999–2002)
for Low PM_{2.5} Days in Philadelphia (Class 1/Green Days)

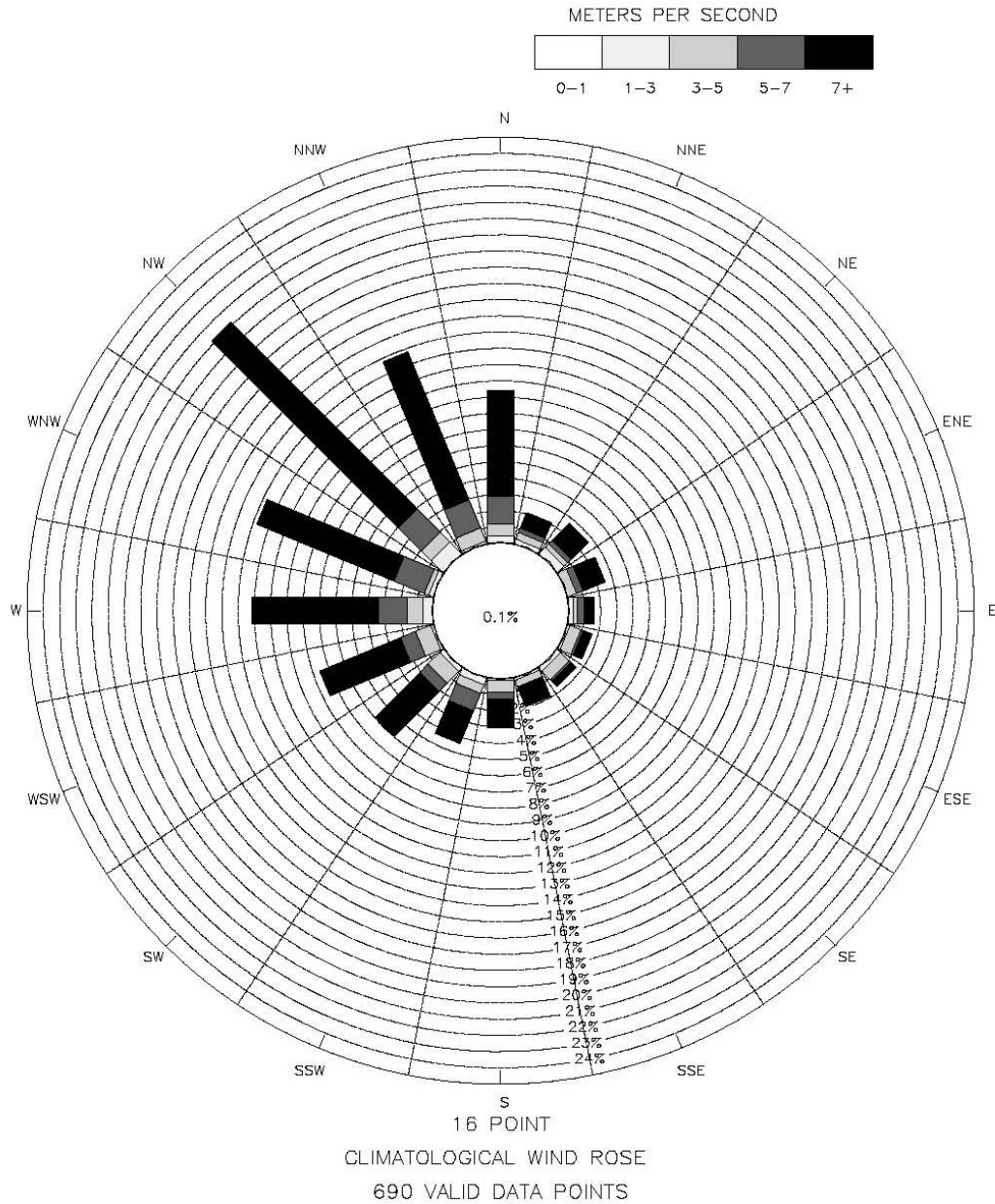


Figure A-13b.
850 mb (am) Winds for Dulles (1999–2002)
for Moderate PM_{2.5} Days in Philadelphia (Class 2/Yellow Days)

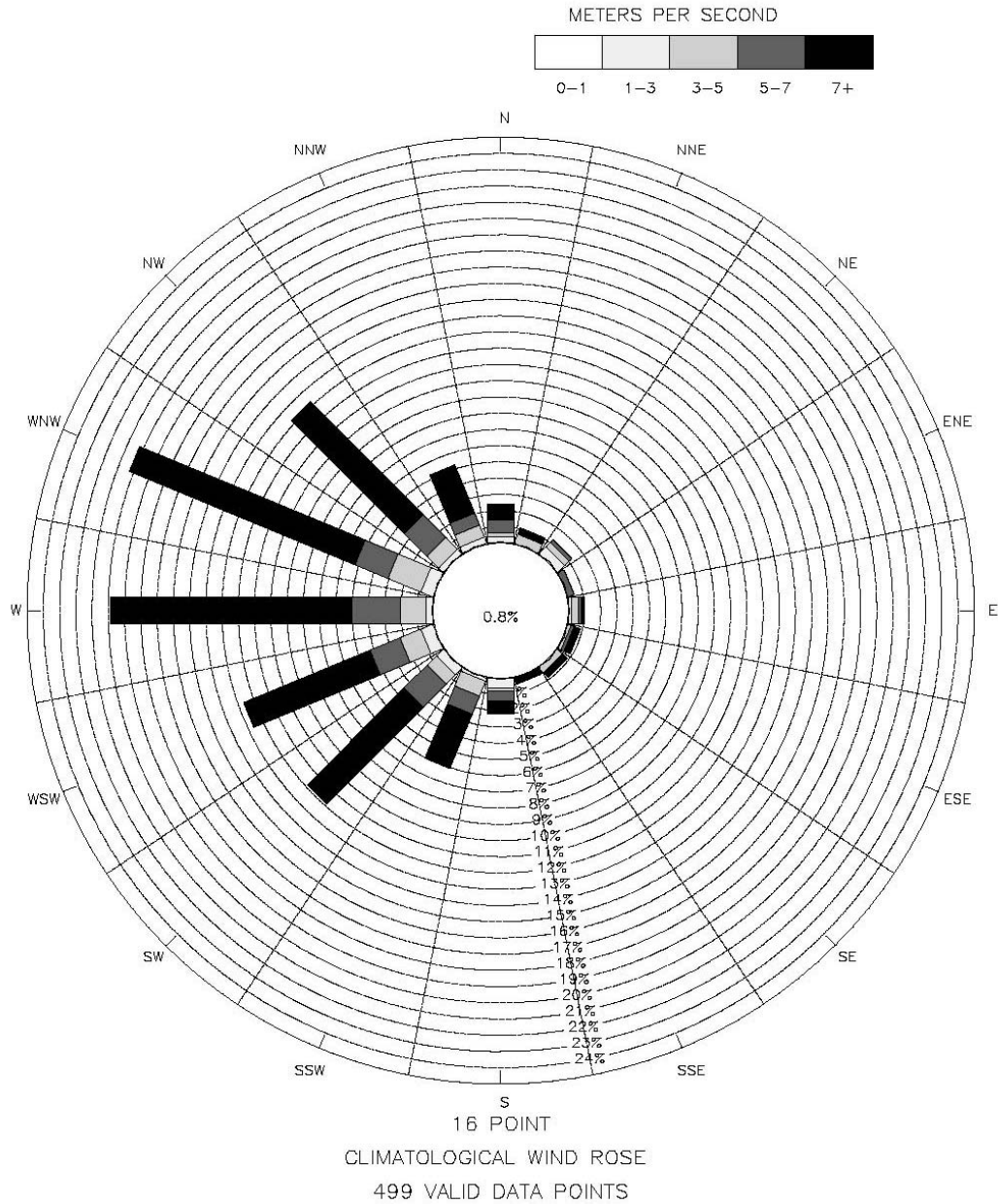


Figure A-13c.
850 mb (am) Winds for Dulles (1999–2002)
for High PM_{2.5} Days in Philadelphia (Class 3/Orange Days)

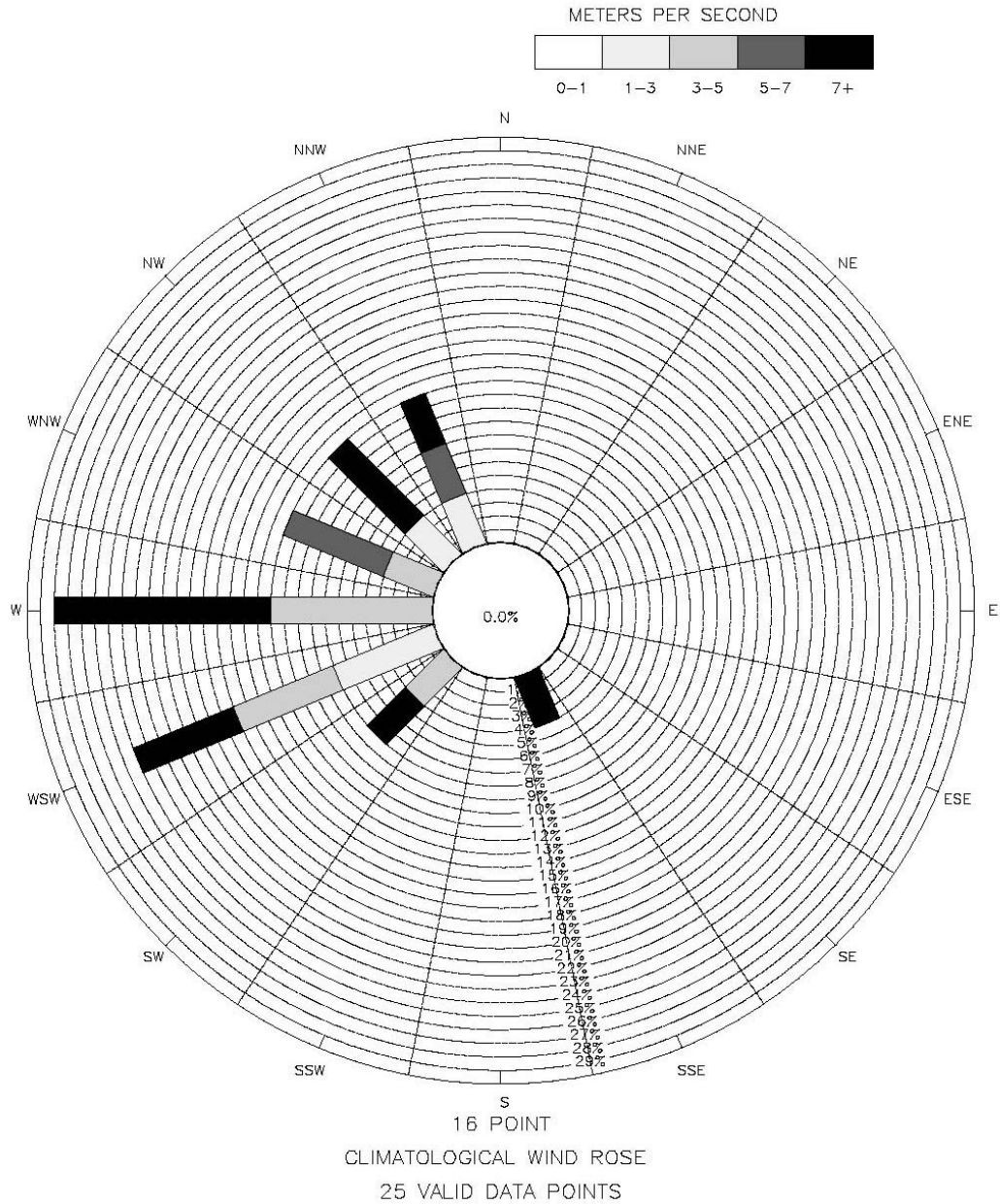


Figure A-14a.
850 mb (pm) Winds for Dulles (1999–2002)
for Low PM_{2.5} Days in Philadelphia (Class 1/Green Days)

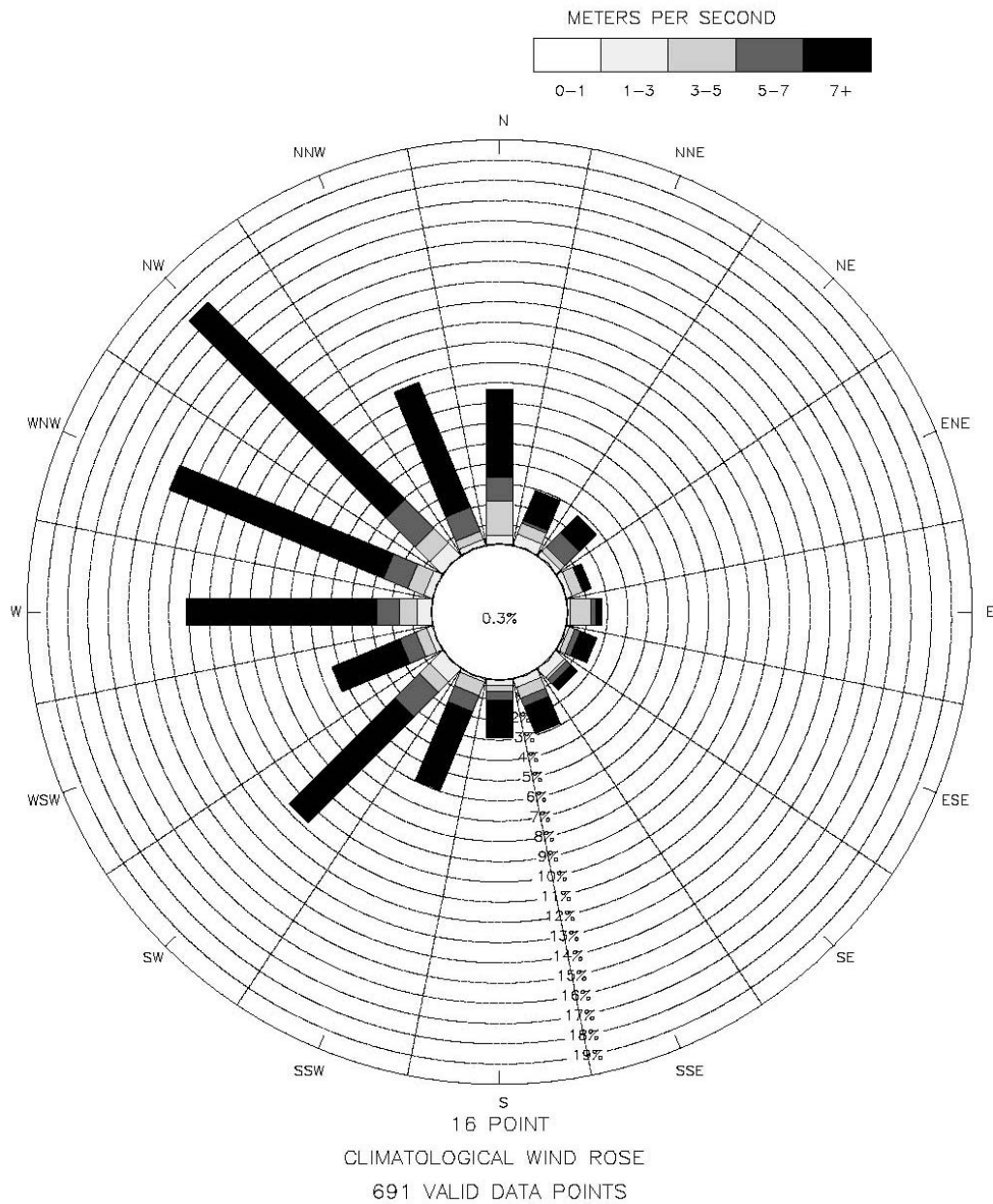


Figure A-14b.
850 mb (pm) Winds for Dulles (1999–2002)
for Moderate PM_{2.5} Days in Philadelphia (Class 2/Yellow Days)

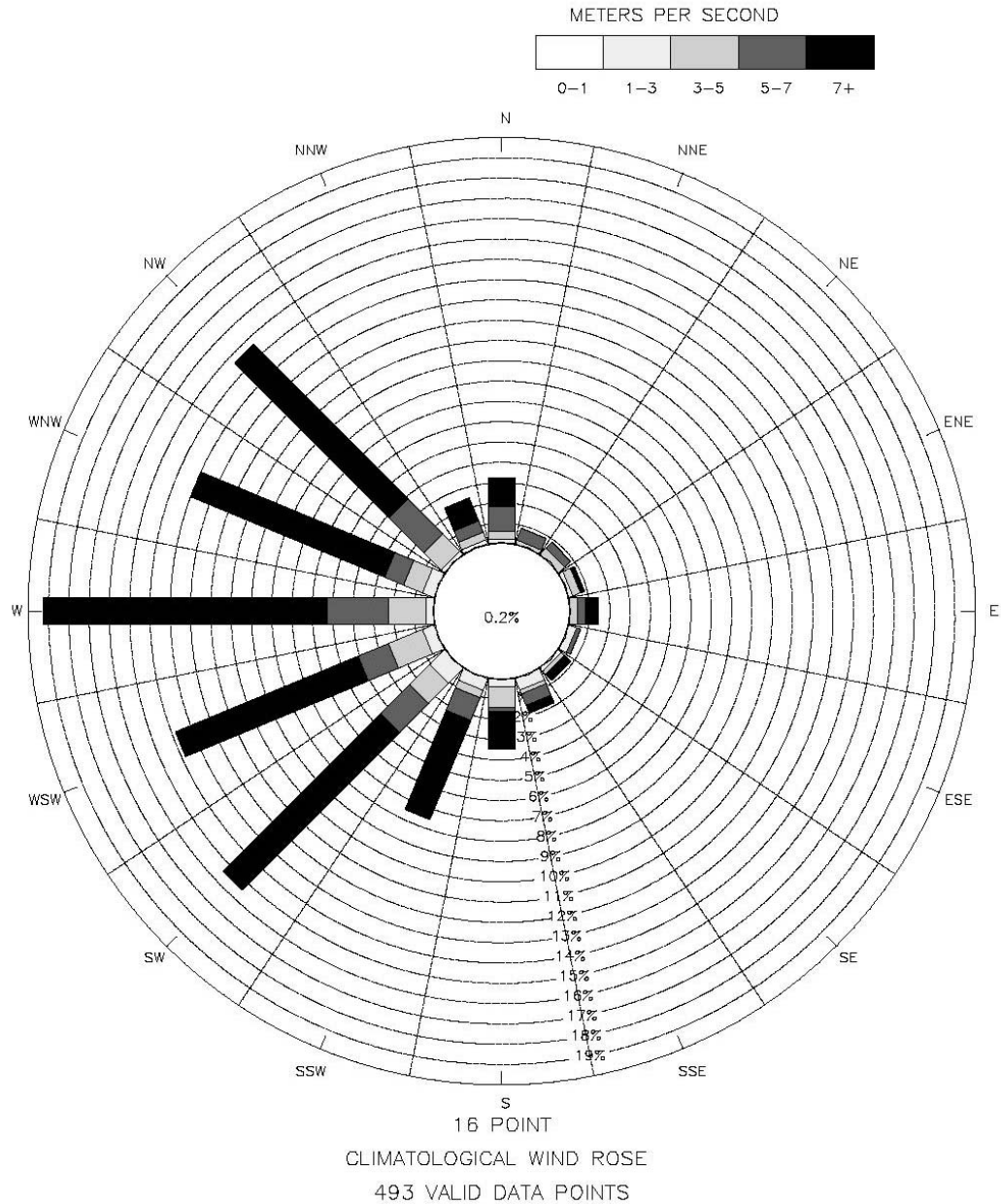


Figure A-14c.
850 mb (pm) Winds for Dulles (1999–2002)
for High PM_{2.5} Days in Philadelphia (Class 3/Orange Days)

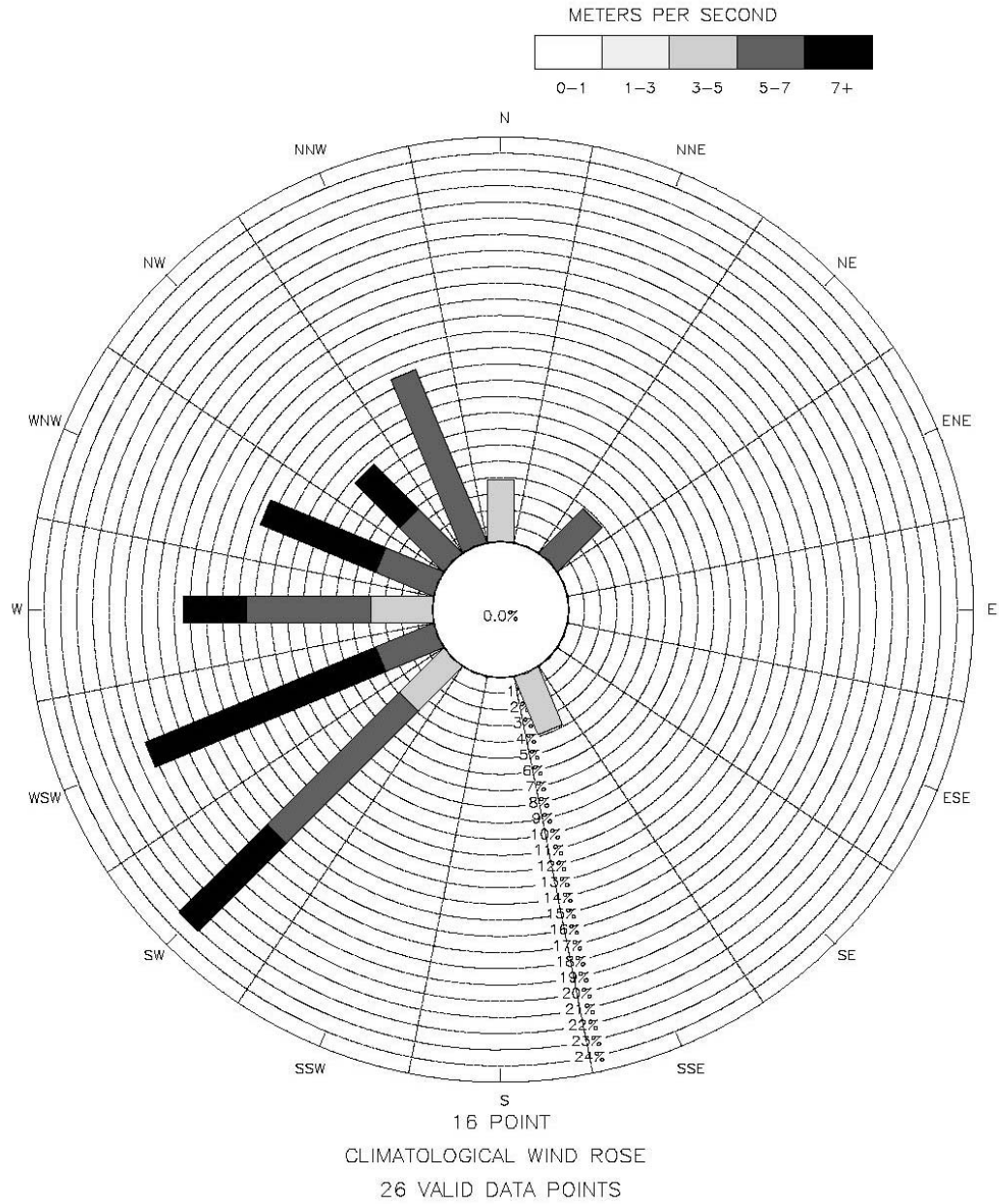


Figure A-15a.
850 mb (am) Winds for Dulles (1999–2002)
for Low PM_{2.5} Days in Wilmington (Class 1/Green Days)

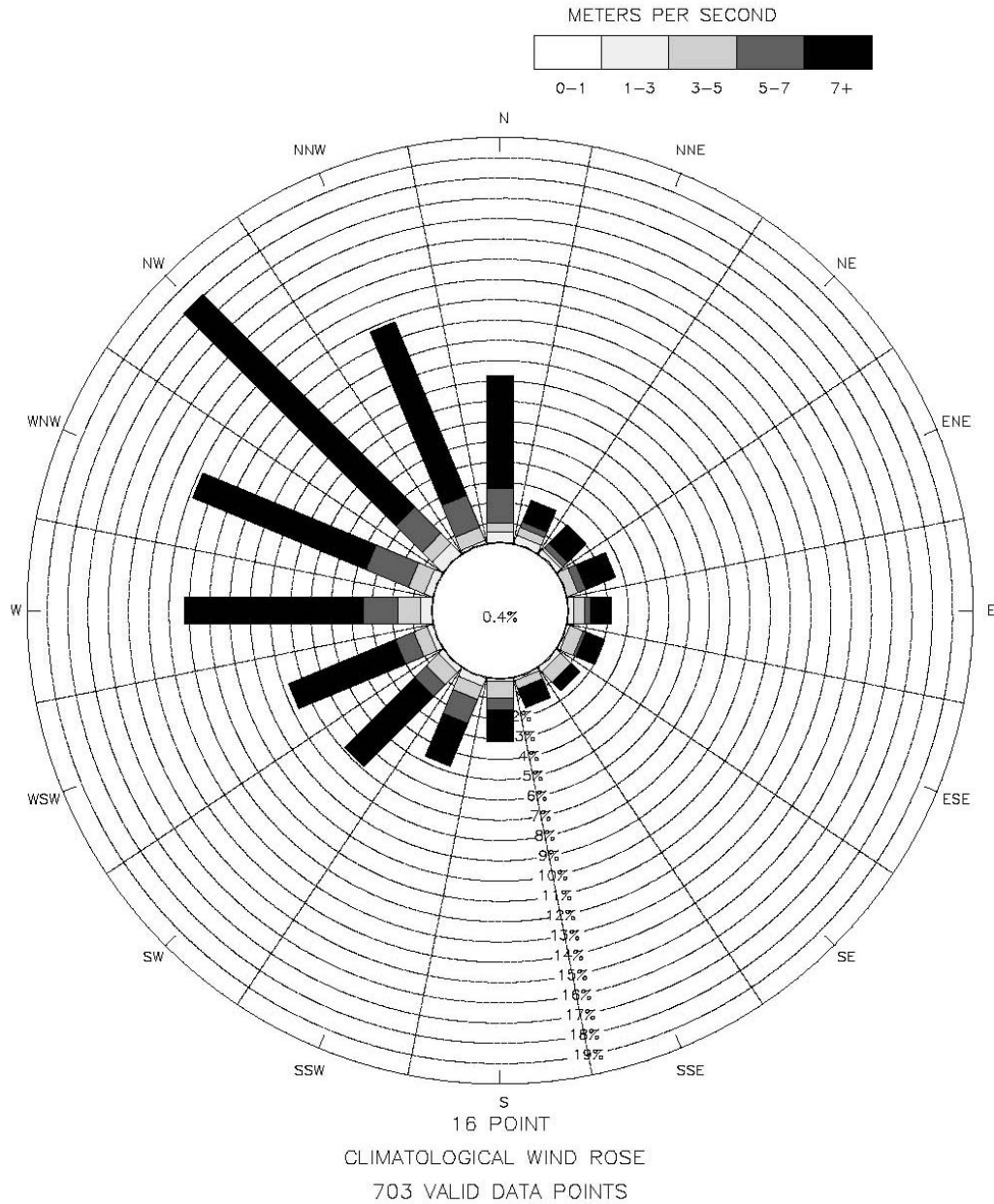


Figure A-15b.
850 mb (am) Winds for Dulles (1999–2002)
for Moderate PM_{2.5} Days in Wilmington (Class 2/Yellow Days)

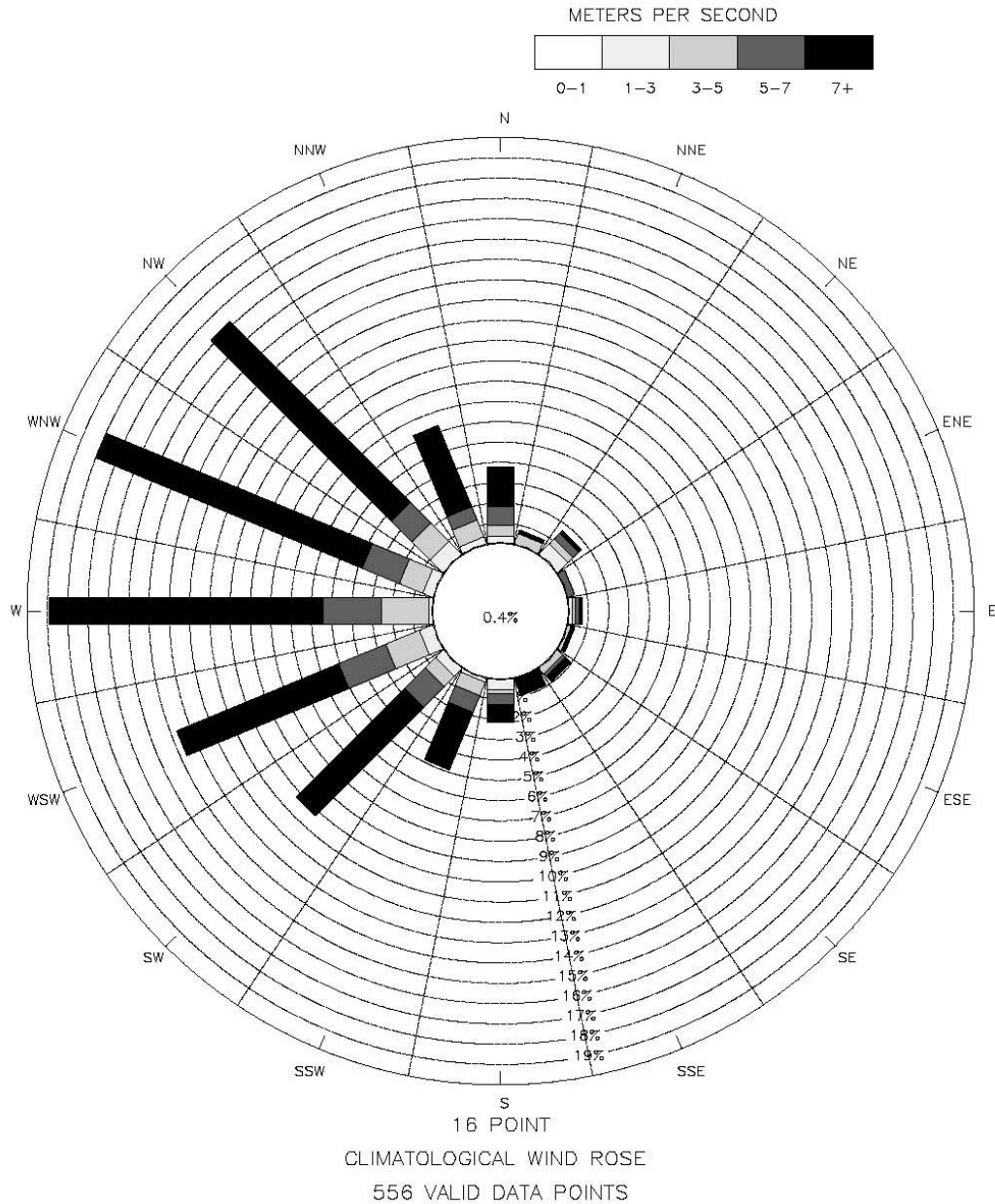


Figure A-15c.
850 mb (am) Winds for Dulles (1999–2002)
for High PM_{2.5} Days in Wilmington (Class 3/Orange Days)

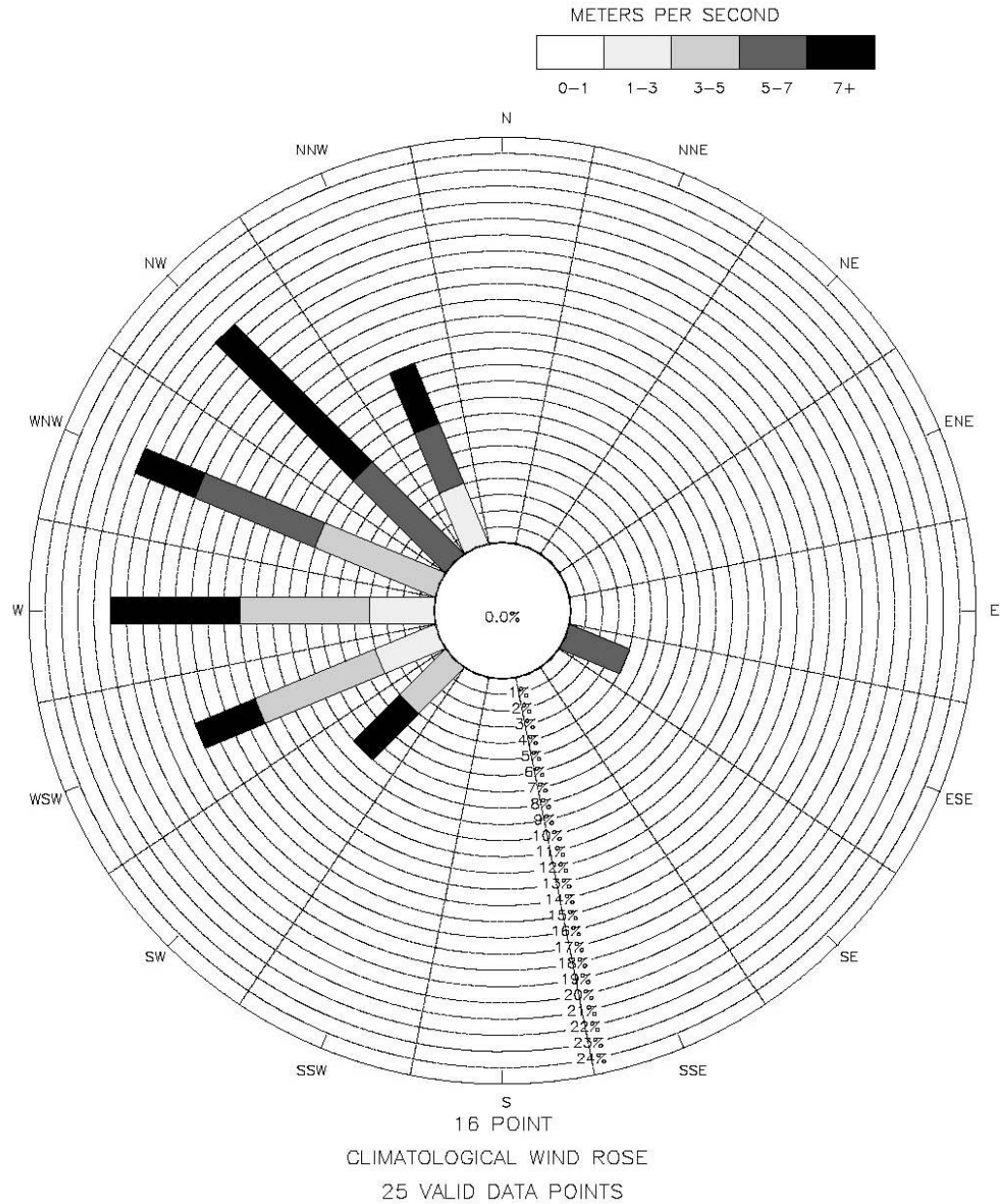


Figure A-16a.
850 mb (pm) Winds for Dulles (1999–2002)
for Low PM_{2.5} Days in Wilmington (Class 1/Green Days)

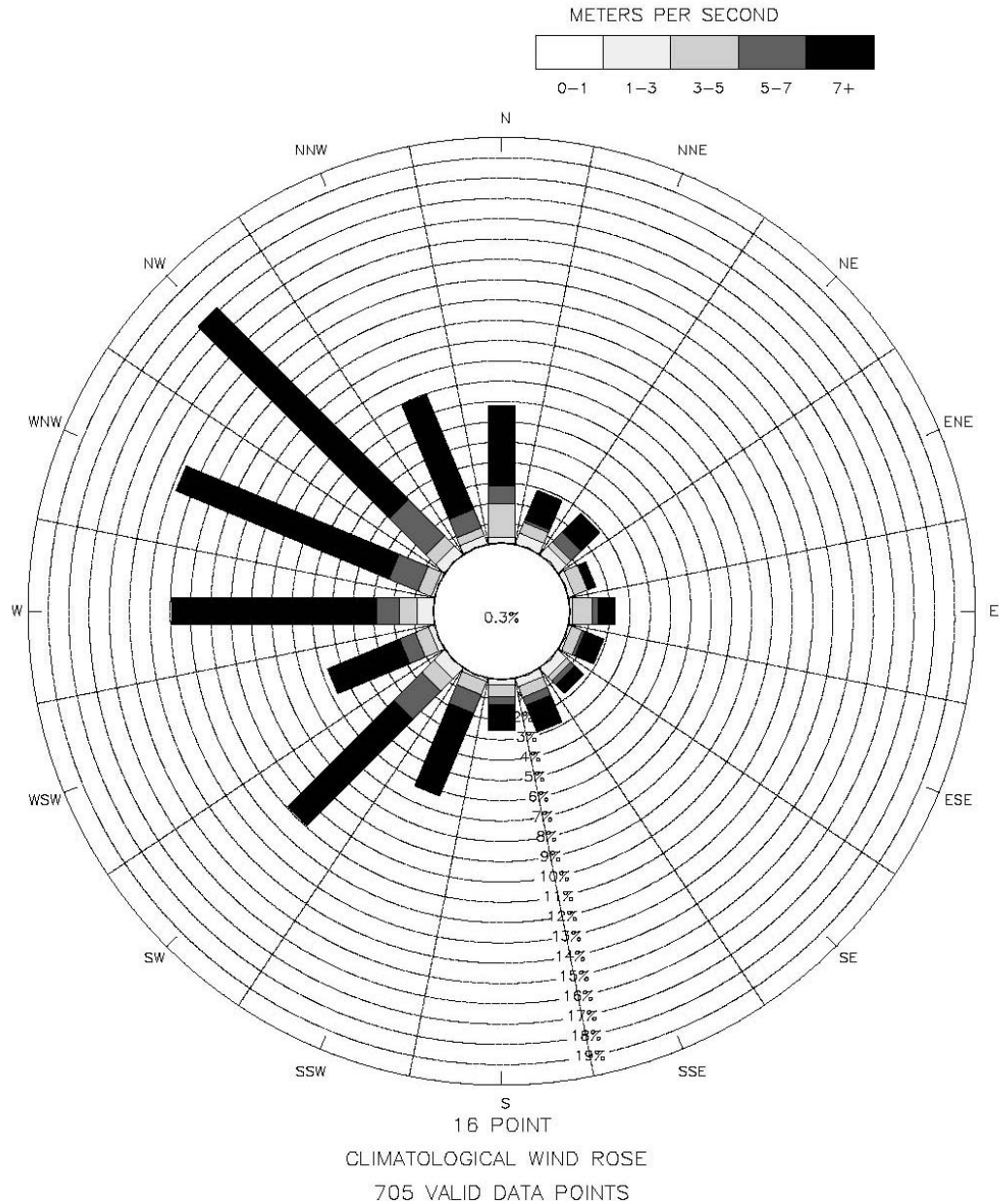


Figure A-16b.
850 mb (pm) Winds for Dulles (1999–2002)
for Moderate PM_{2.5} Days in Wilmington (Class 2/Yellow Days)

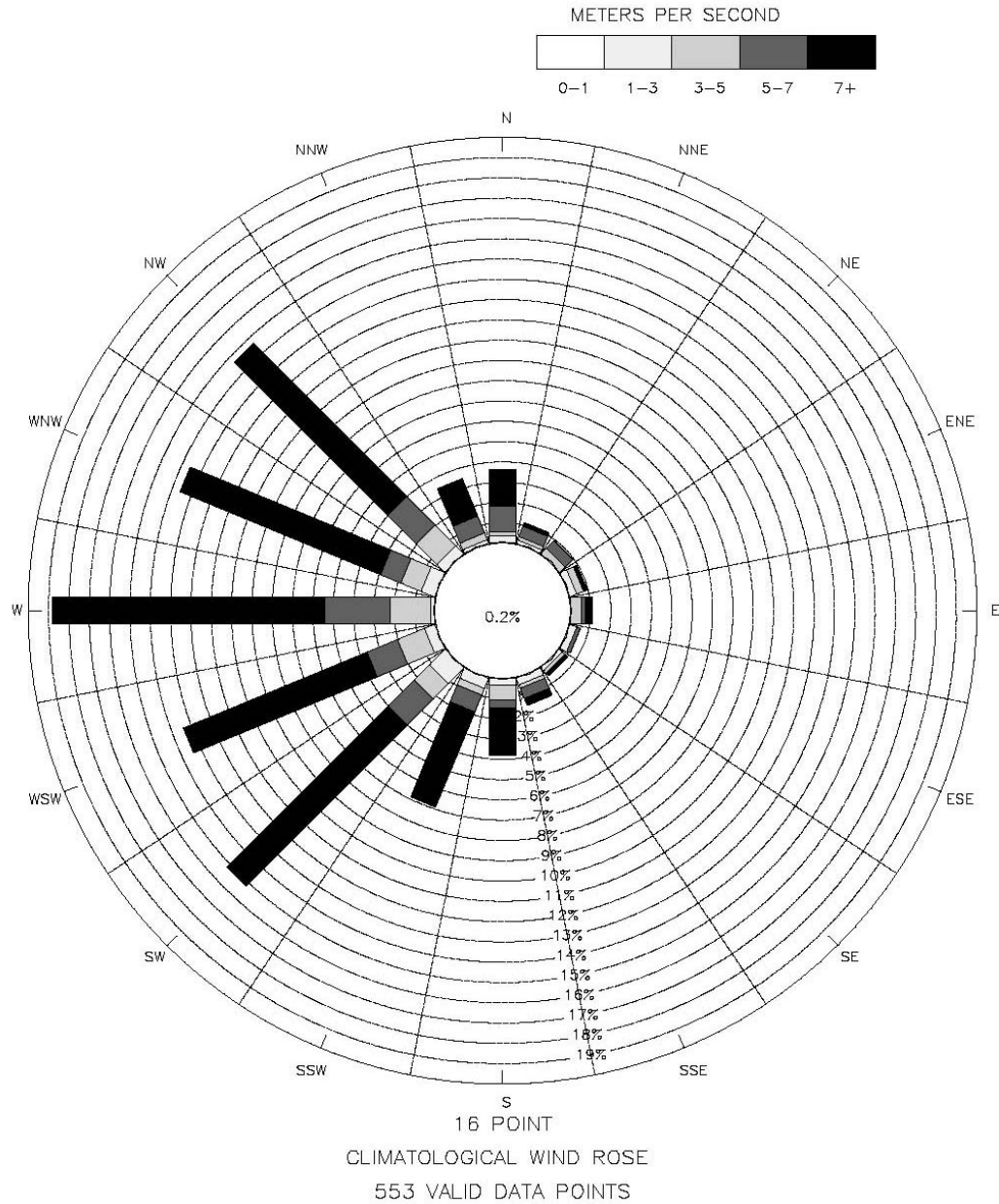


Figure A-16c.
850 mb (pm) Winds for Dulles (1999–2002)
for High PM_{2.5} Days in Wilmington (Class 3/Orange Days)

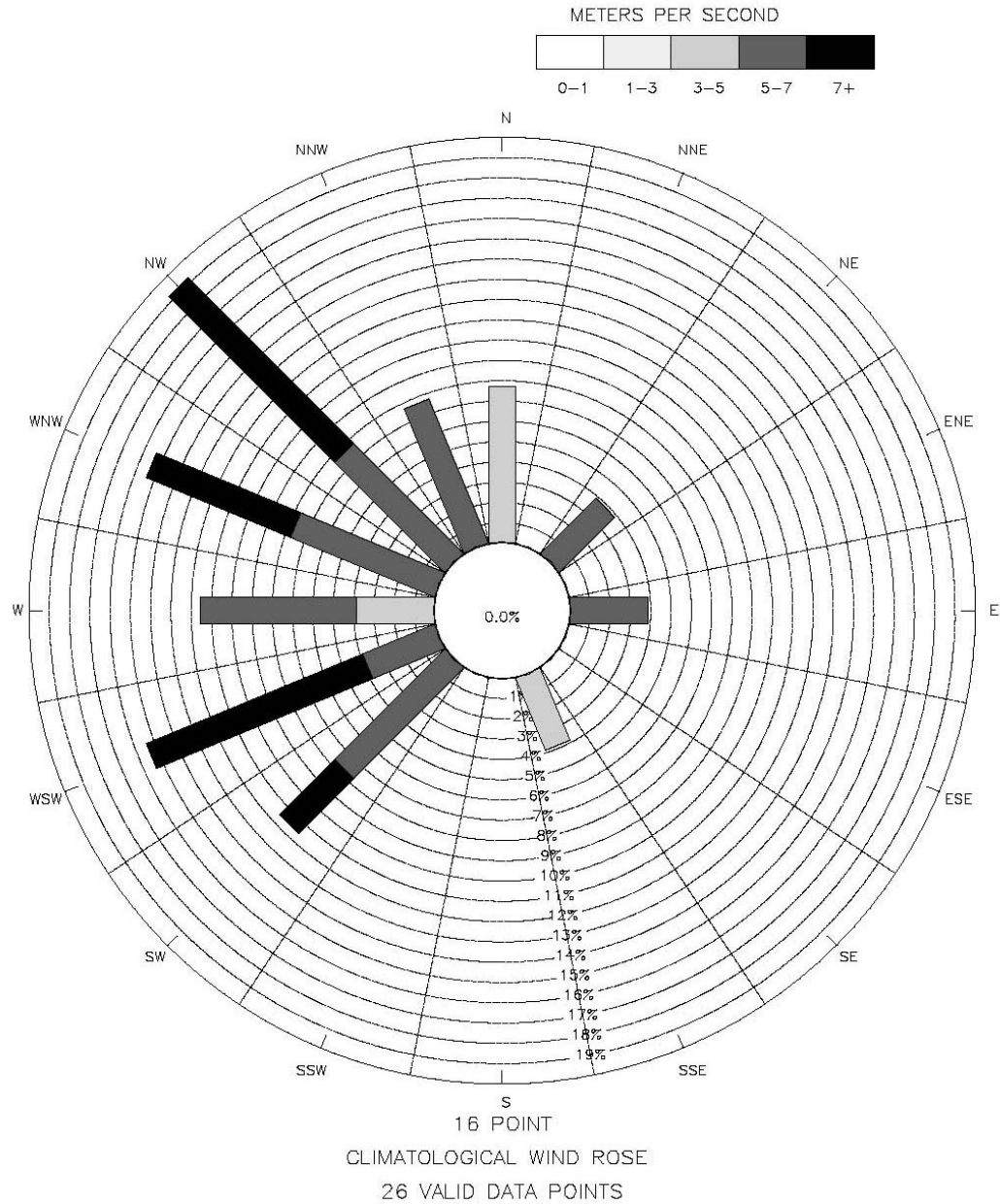


Figure A-17a.
850 mb (am) Winds for Brookhaven (1999–2002)
for Low PM_{2.5} Days in Newark (Class 1/Green Days)

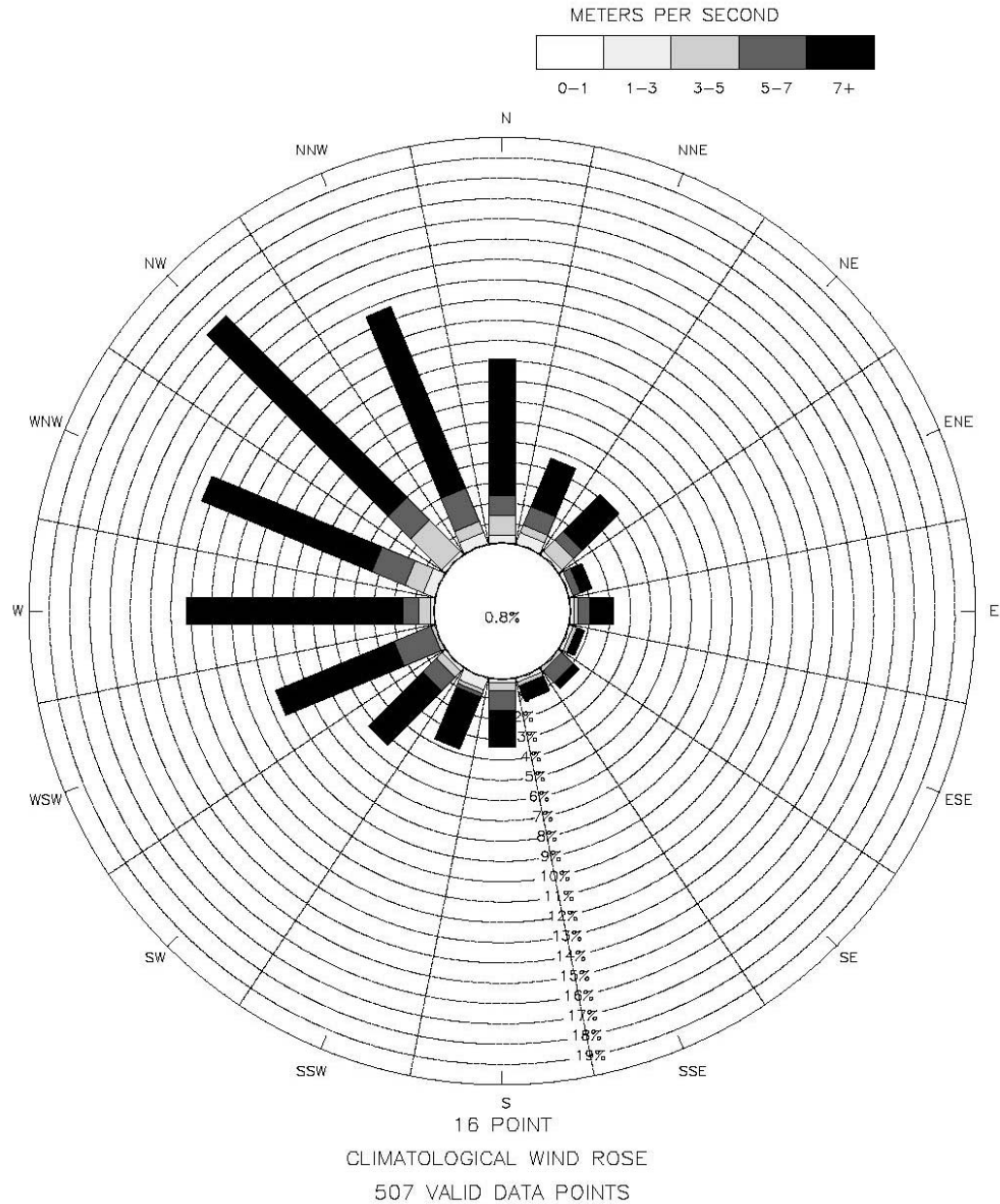


Figure A-17b.
850 mb (am) Winds for Brookhaven (1999–2002)
for Moderate PM_{2.5} Days in Newark (Class 2/Yellow Days)

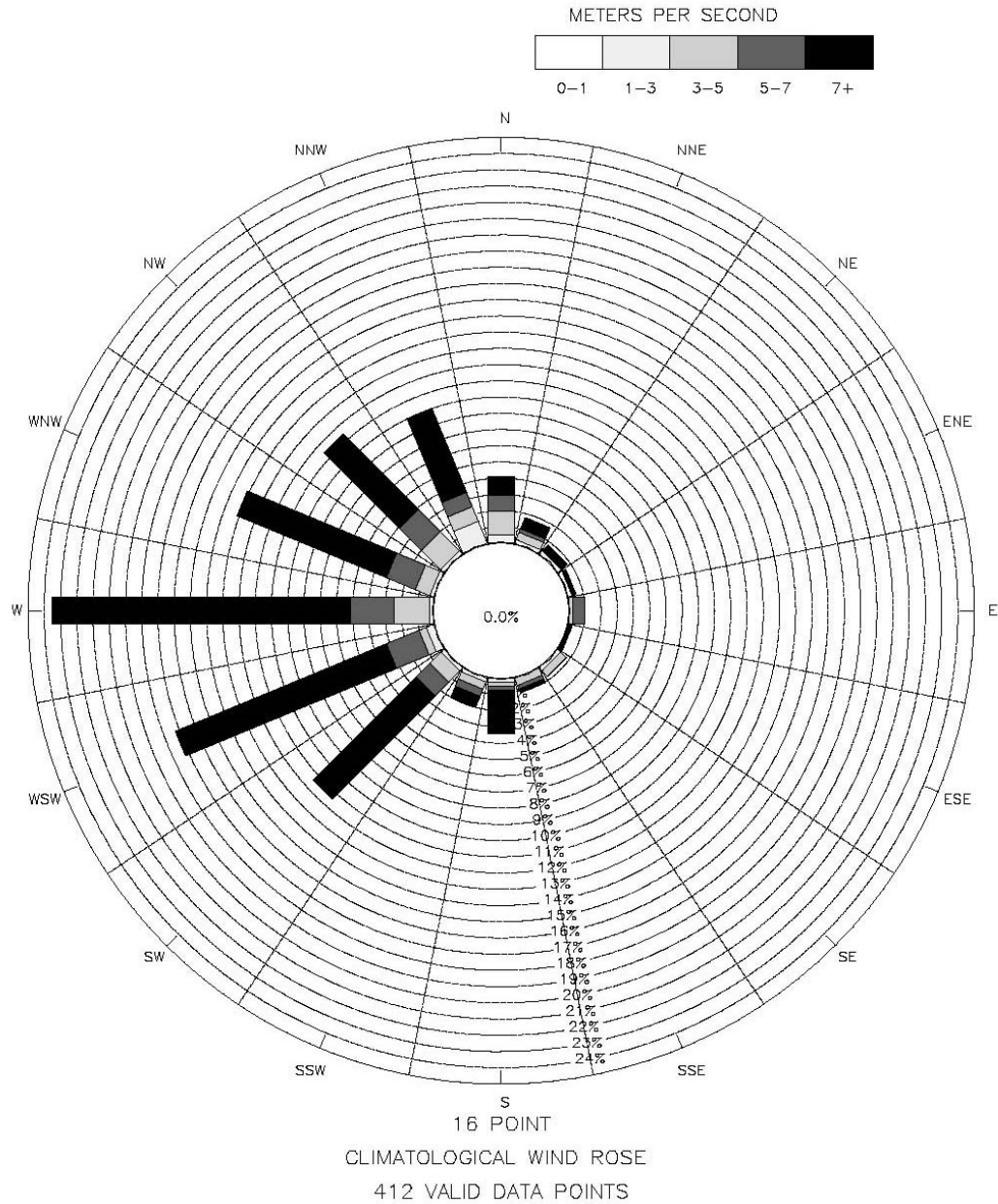


Figure A-17c.
850 mb (am) Winds for Brookhaven (1999–2002)
for High PM_{2.5} Days in Newark (Class 3/Orange Days)

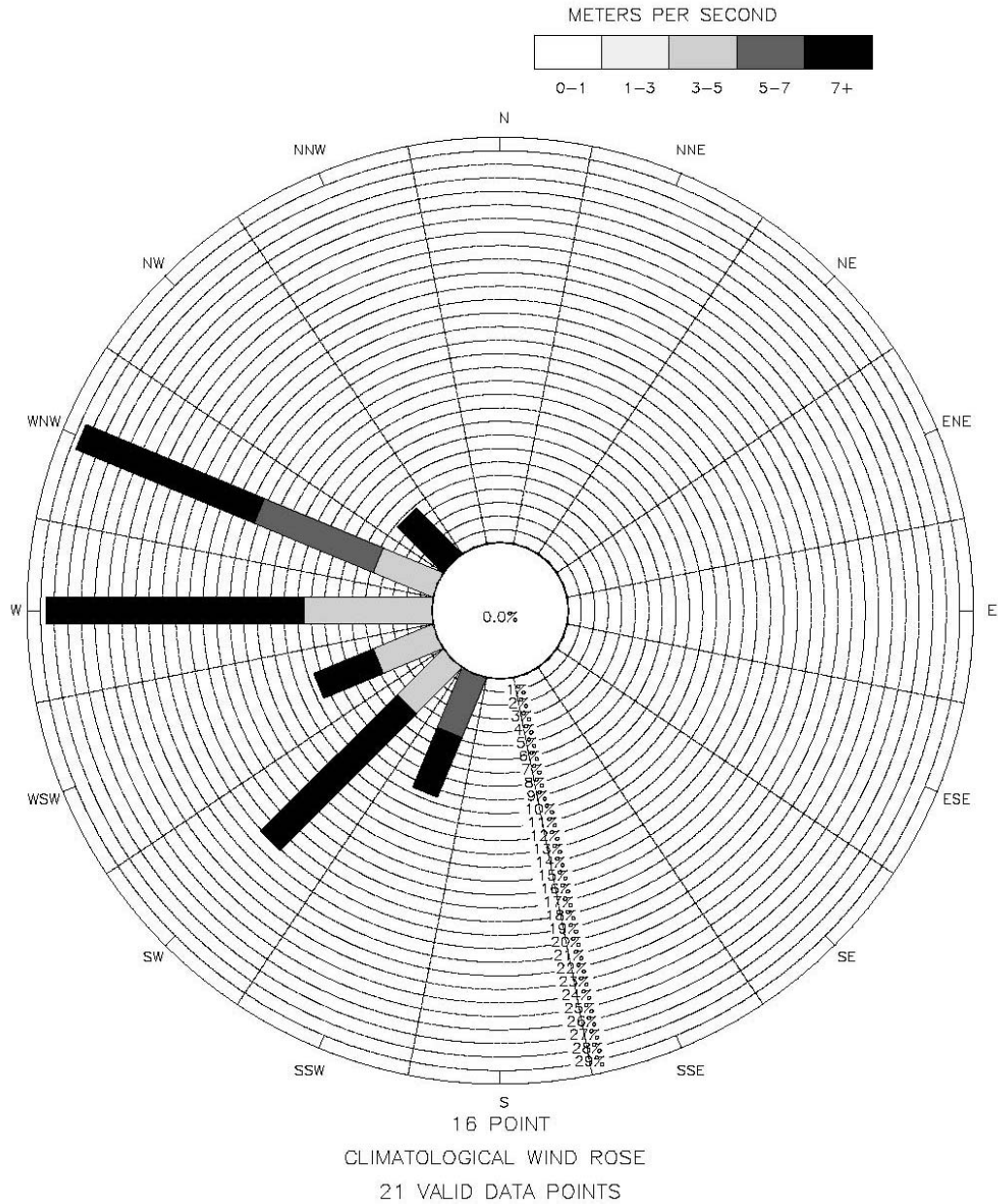


Figure A-18a.
850 mb (pm) Winds for Brookhaven (1999–2002)
for Low PM_{2.5} Days in Newark (Class 1/Green Days)

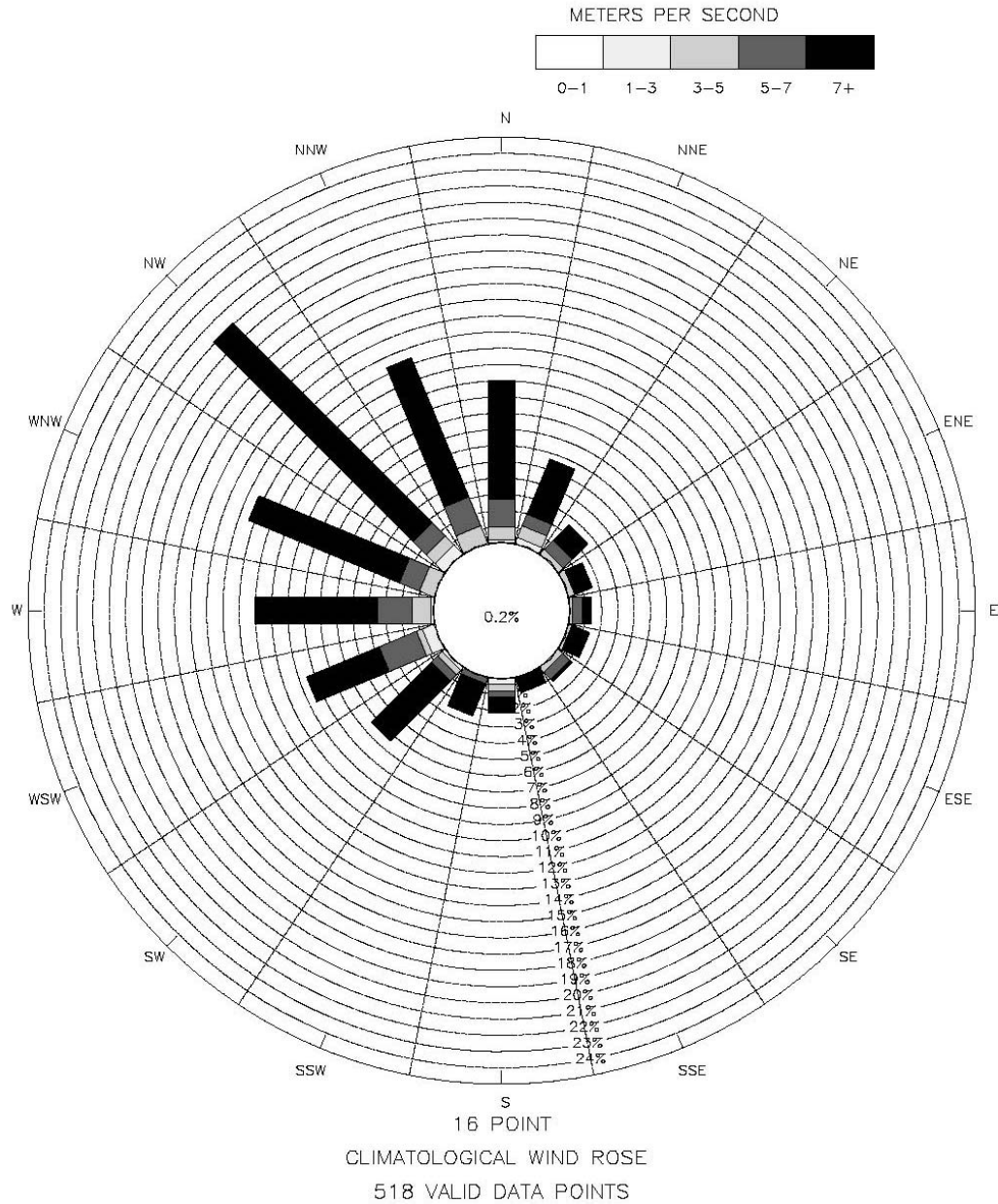


Figure A-18b.
850 mb (pm) Winds for Brookhaven (1999–2002)
for Moderate PM_{2.5} Days in Newark (Class 2/Yellow Days)

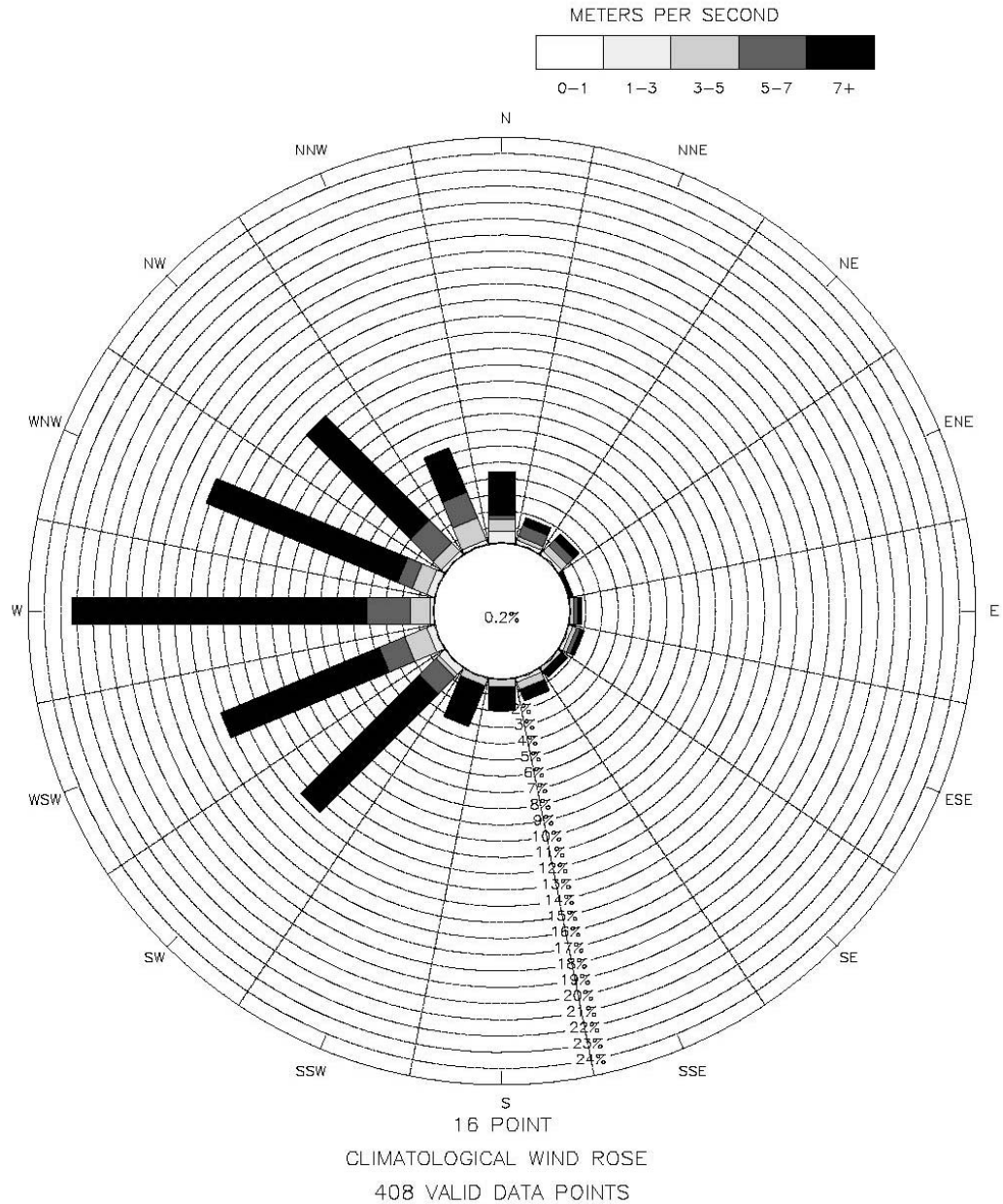
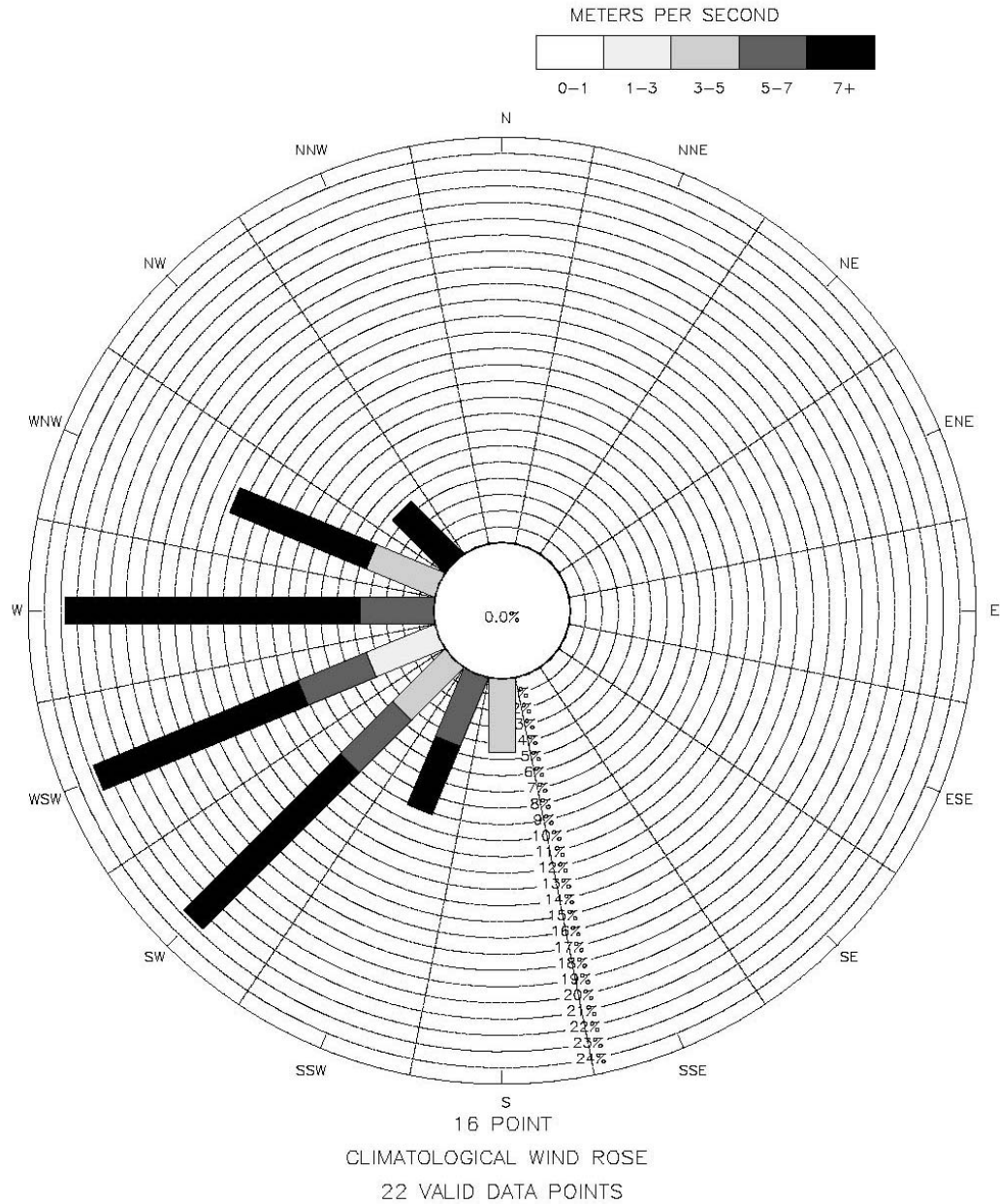


Figure A-18c.
850 mb (pm) Winds for Brookhaven (1999–2002)
for High PM_{2.5} Days in Newark (Class 3/Orange Days)



This page intentionally left blank.