

Analisi dei profili verticali di aerosol durante campagne di misura intensive

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Dept. Physical and Chemical Sciences

Center of Excellence CETEMPS

Università degli Studi dell'Aquila

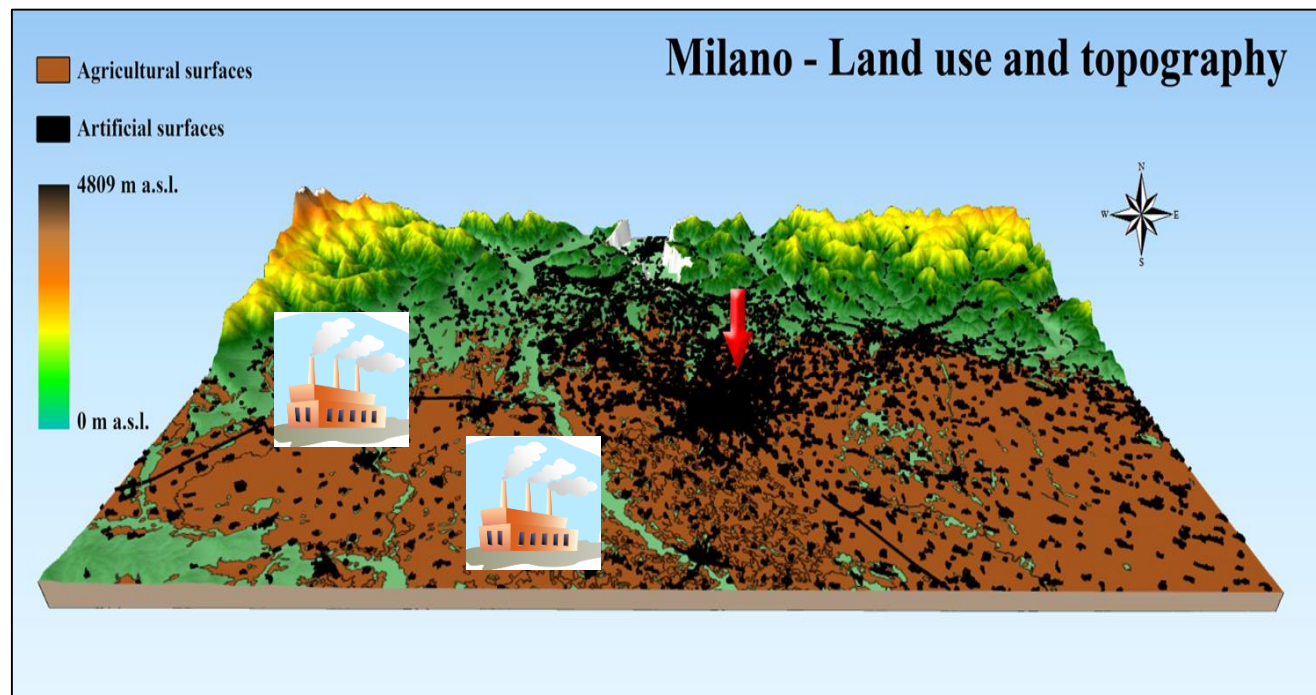


Obiettivi

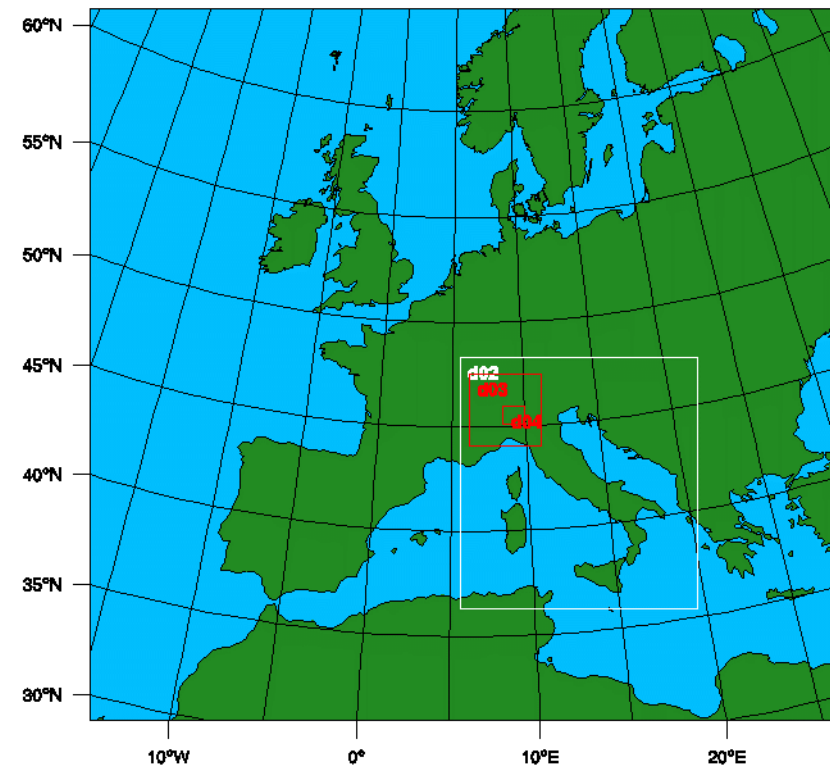
- › Indagare il comportamento dei profili verticali di PM10 e Black Carbon (BC) in due valli italiane (Terni e Milano)
- › Analizzare l'impatto della circolazione locale sulla loro distribuzione verticale.
- › Ottenere informazioni sulla distribuzione verticale di BC e PM10 e sulle loro variazioni orarie.



Milano



- È la seconda città più popolata d'Italia e si trova nella pianura Padana.
- Il sito di campionamento si trova a N della città.
- Industrie a S e W
- Modelli utilizzati : accoppiamento WRF-CHIMERE.

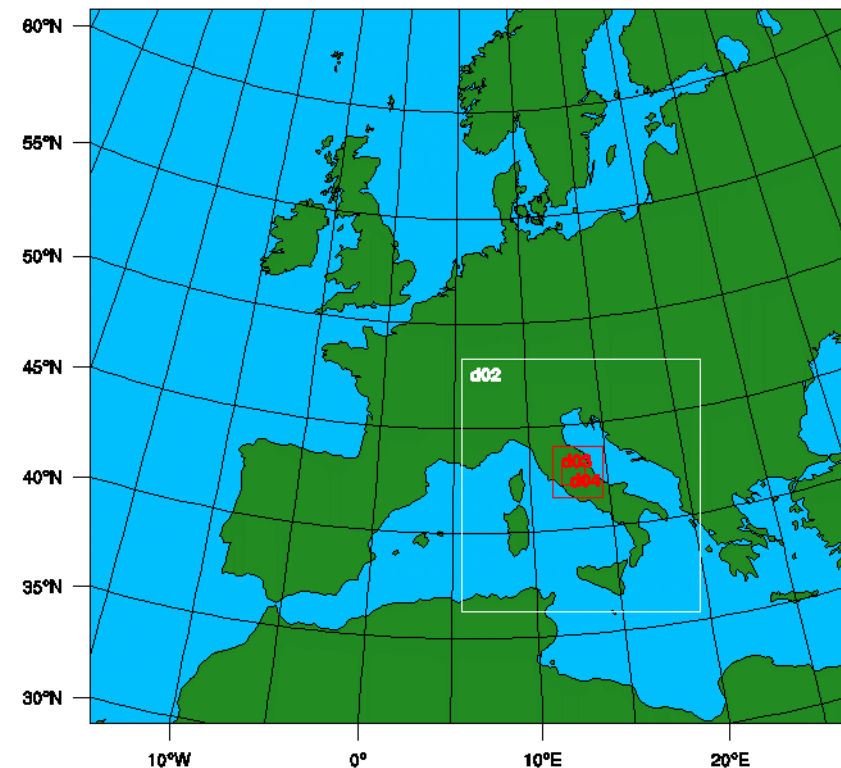
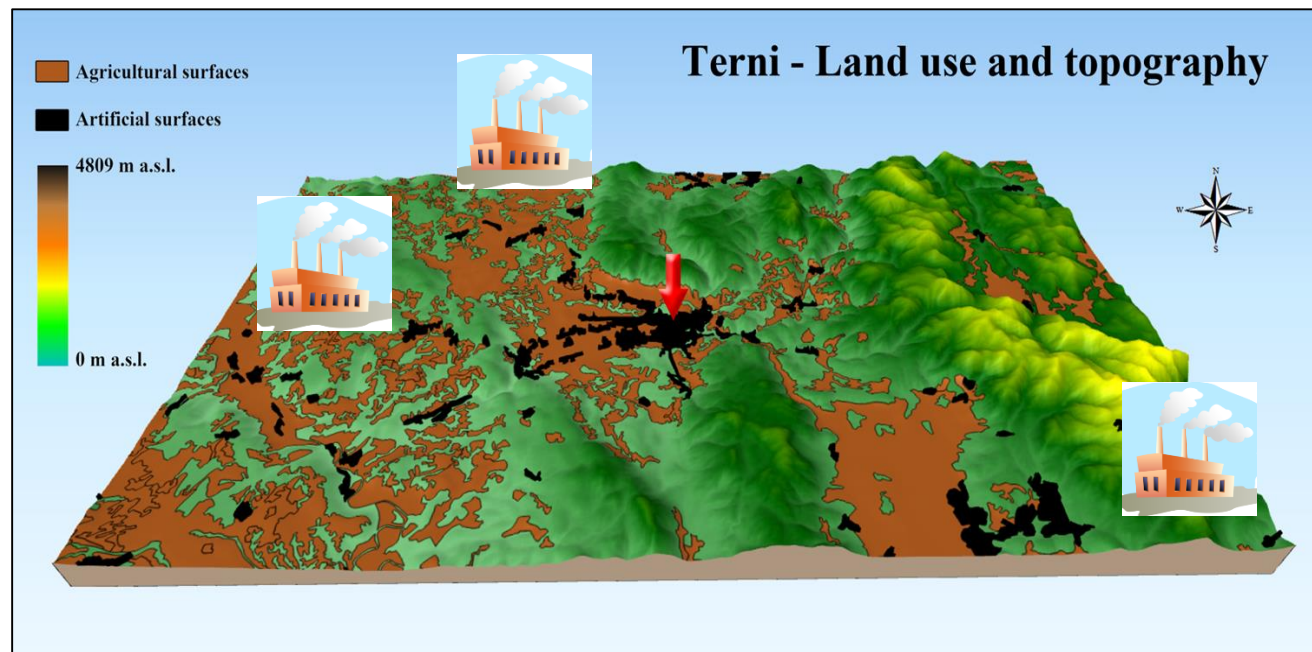


	dx = dy WRF (km)	dx = dy CHIMERE (°)
d01 (EUR)	36	0.5
d02 (ITA)	12	0.12
d03	4	0.04
d04	1.3	0.015





Terni



- Terni è situata nel centro Italia circondata dagli Appennini
- Il sito di campionamento si trova a nord della città.
- Industrie situate in NW, W e SE

	dx = dy WRF (km)	dx = dy CHIMERE (°)
d01 (EUR)	36	0.5
d02 (ITA)	12	0.12
d03	4	0.04
d04	1.3	0.015





Dataset

- › Variabili a terra:
- › Stazioni meteorologiche dalle ARPA regionali
- › PM10 a terra
- › Centraline

I profili verticali di BC e PM10 sono stati acquisiti mediante lanci di pallone frenato.

Strumentazione per l'analisi:

- Stazione meteorologica
- Optical Particle Counter (OPC)
- Impattore a cascata
- Micro etalometro



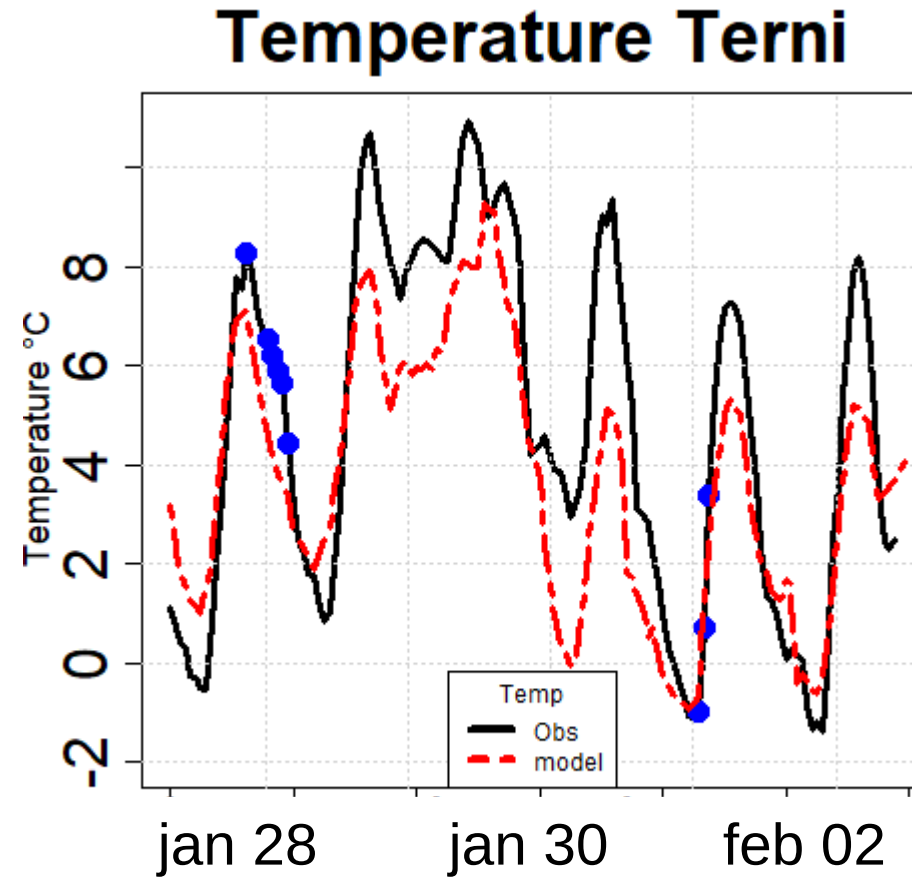
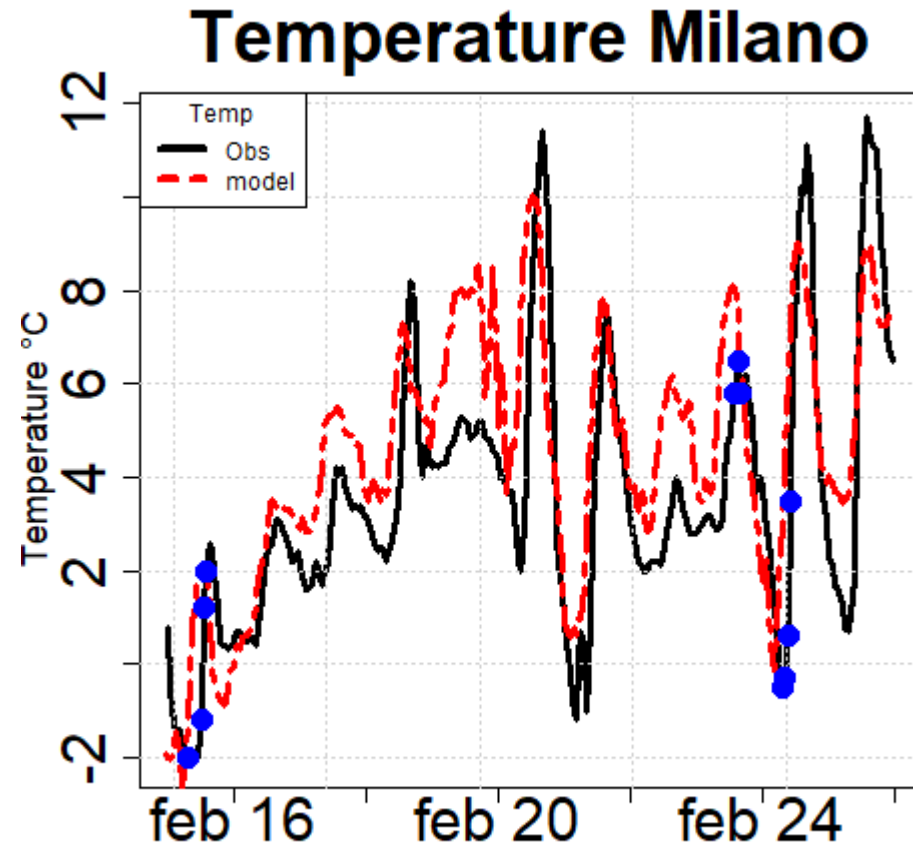
Campagna di misure

City	Terni	Milano
Campaign period	28 Jan-02 Feb 2010	15 Feb -25 Feb 2010
N° of launches :	11	13
Max. Height (m a.g.l.)	400-500 m	600-700 m
Local sunrise in UTC	07:20	07:20
Local sunset	17:20	18:00

L. Ferrero et al., 2014



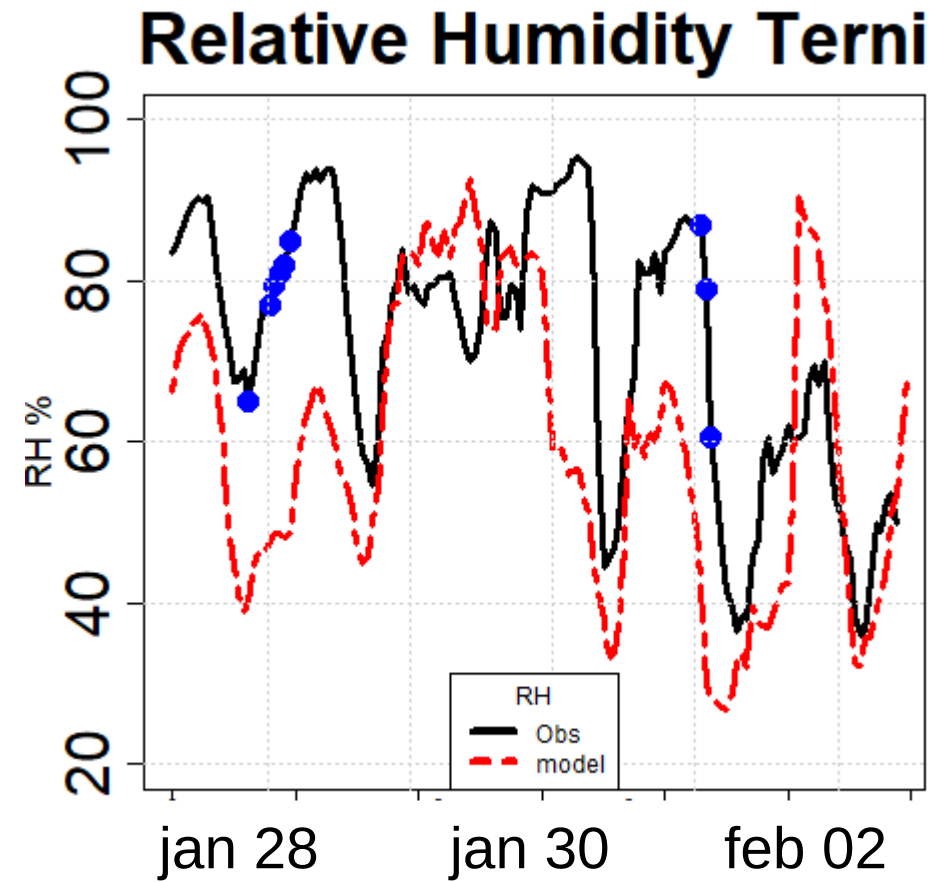
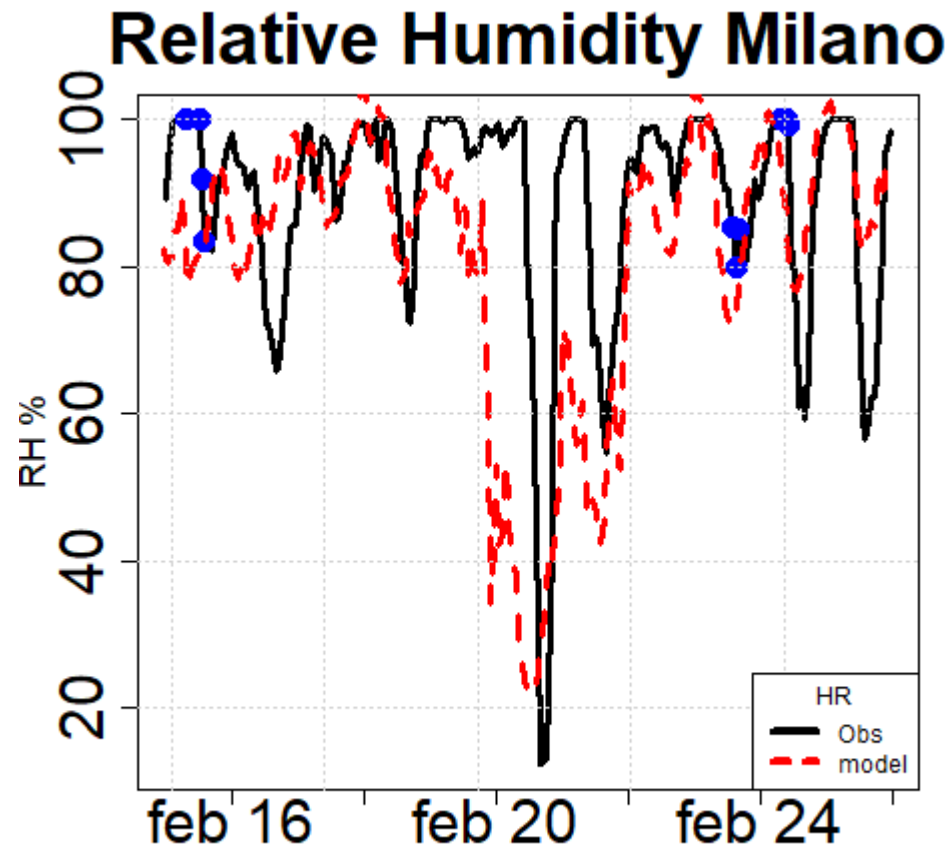
Temperatures Time Series (surface)



●
Days of
launches



Relative Humidity Time Series (surface)



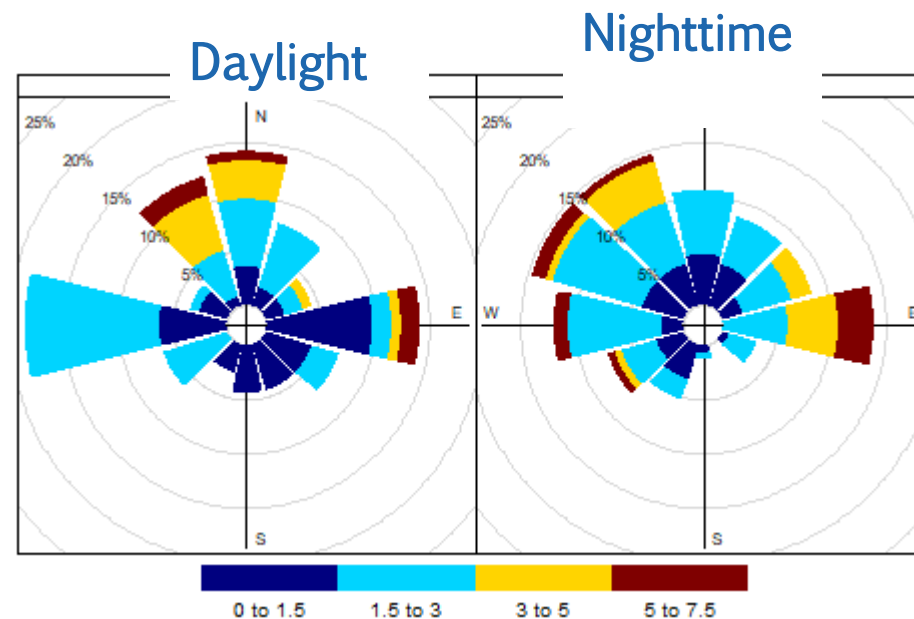
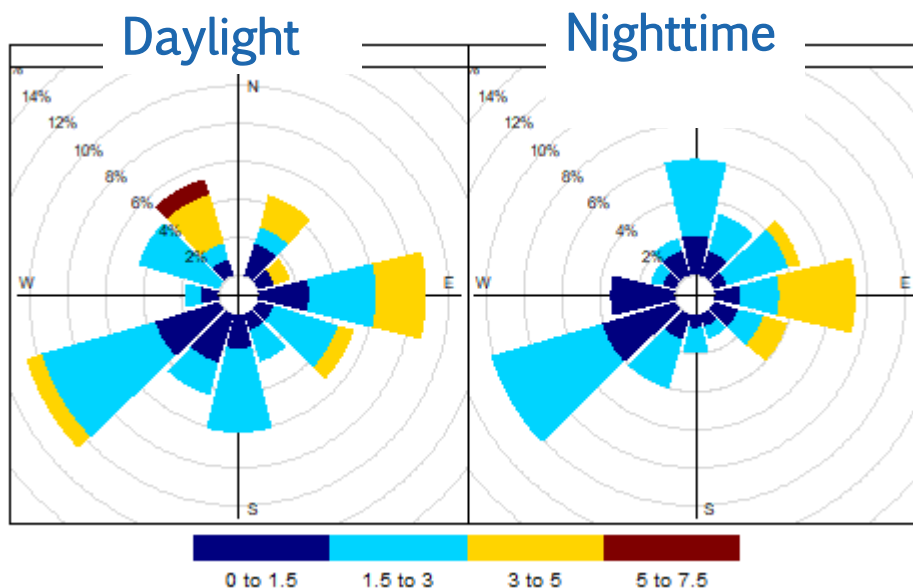
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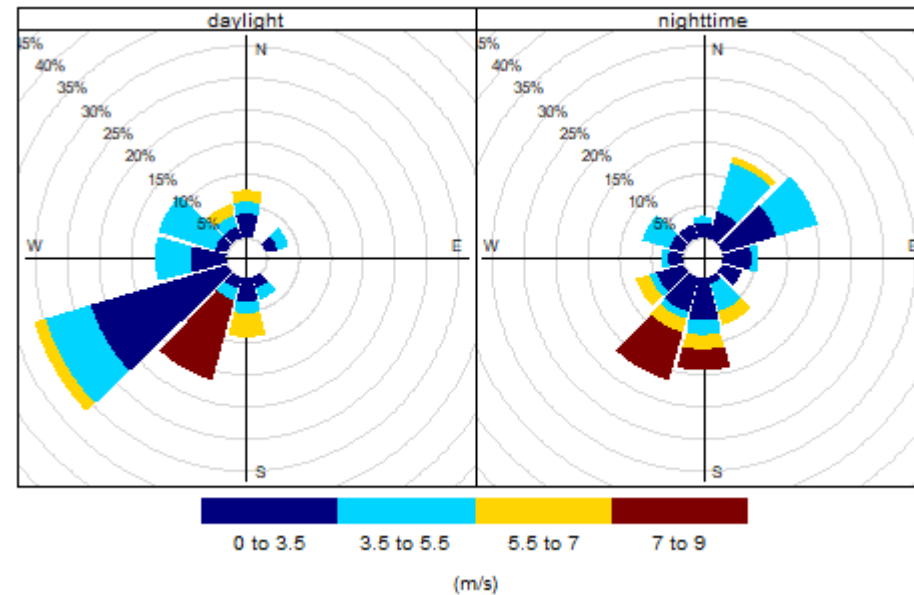
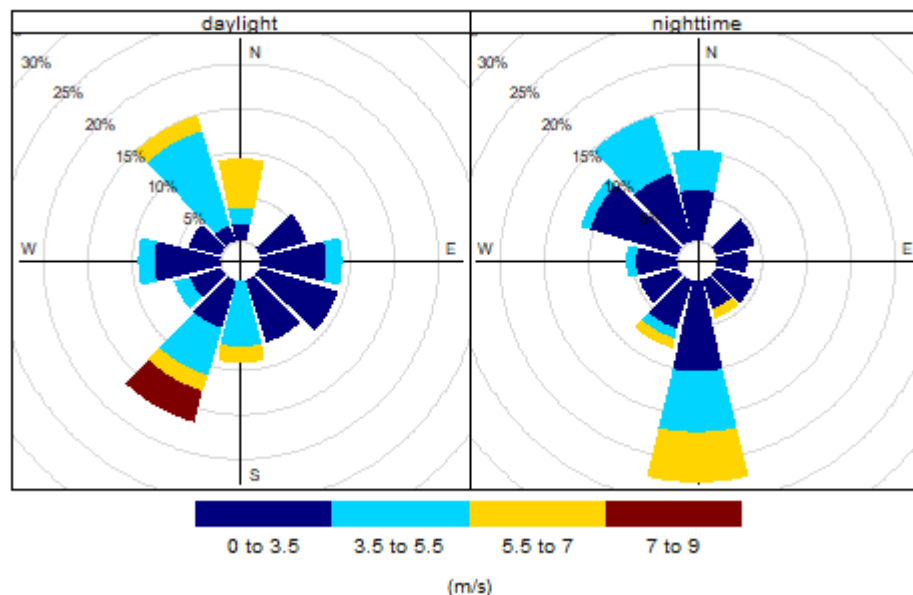
Observed Wind rose

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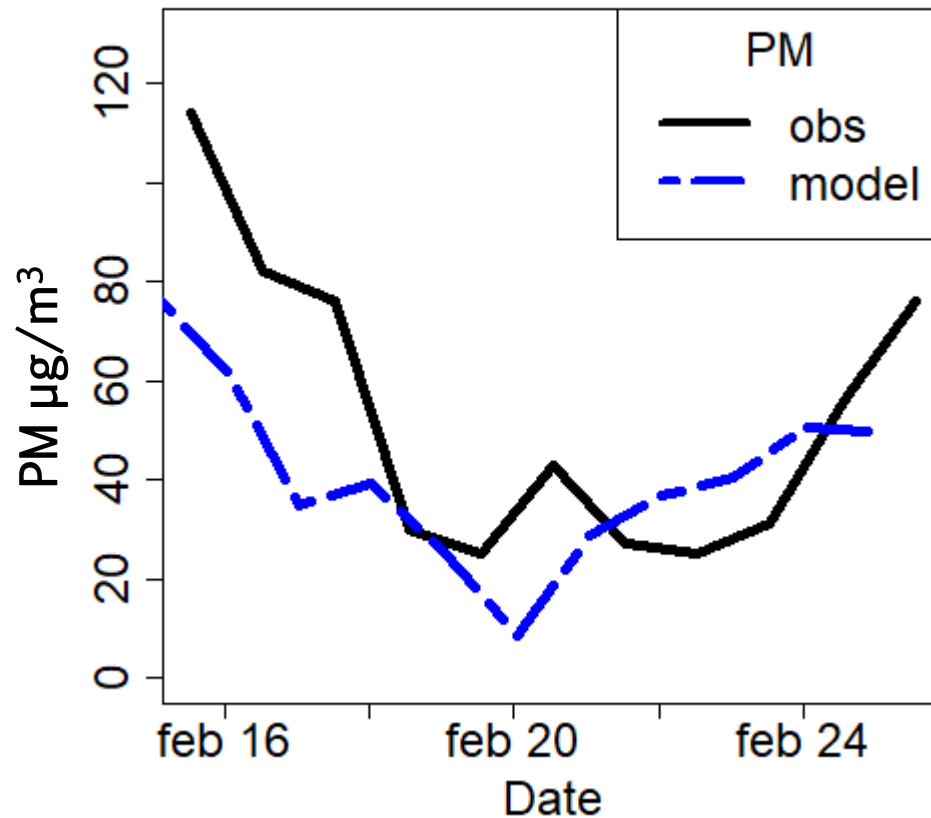
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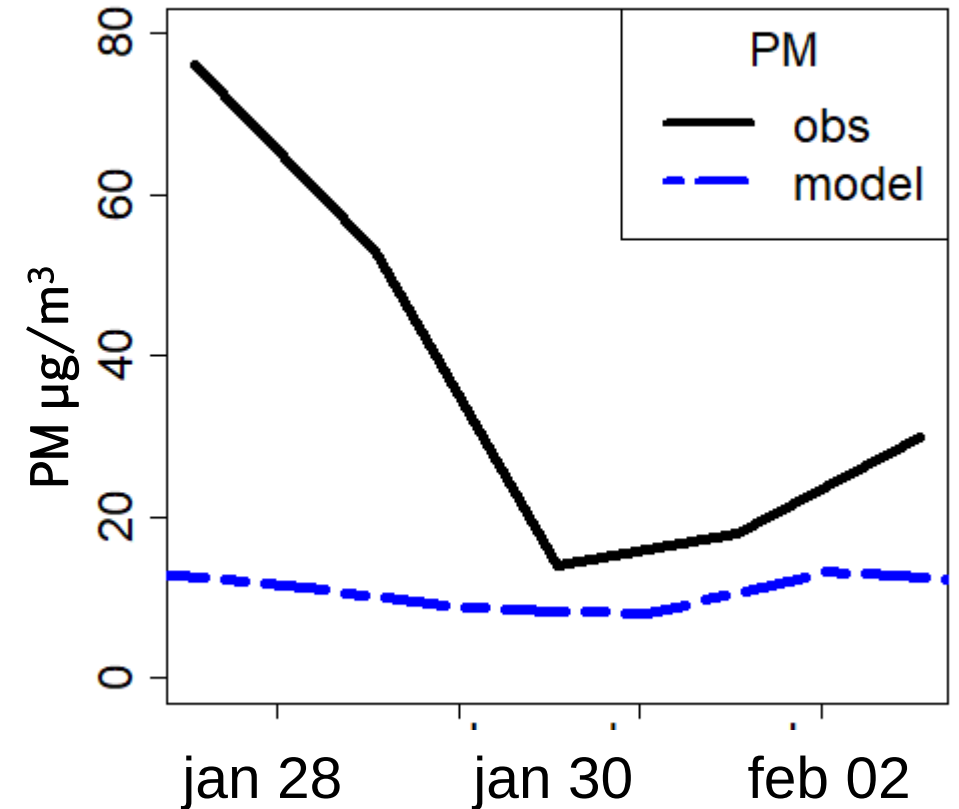


PM10 Time Series rilevato a terra durante il period di campagna

PM10 Milano Time series Feb 2010



PM10 Terni Time series Jan-Feb 2010



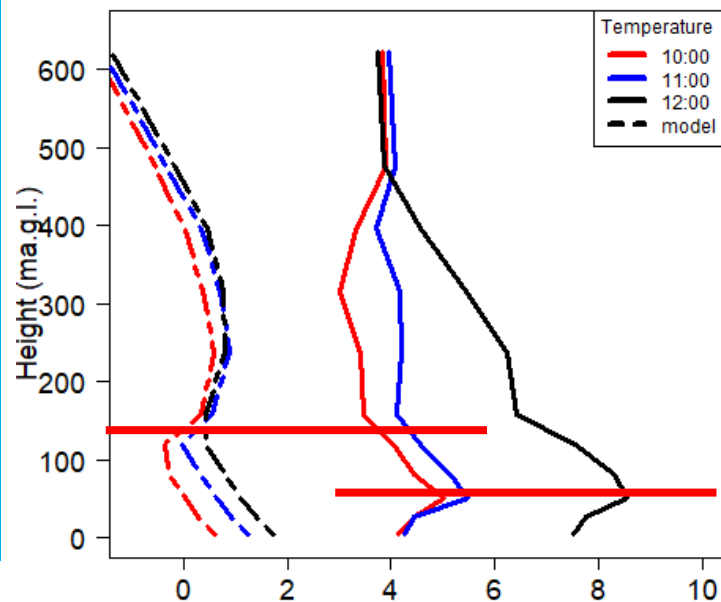


TEMPERATURE

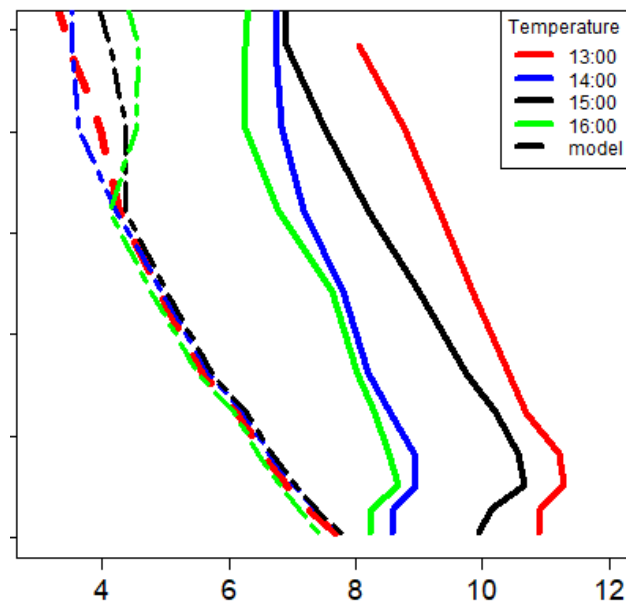
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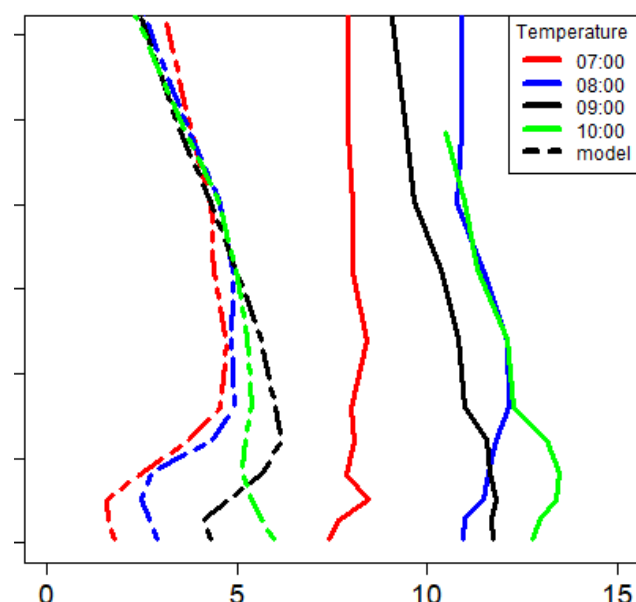
Temperature Milano 15 Feb 2010



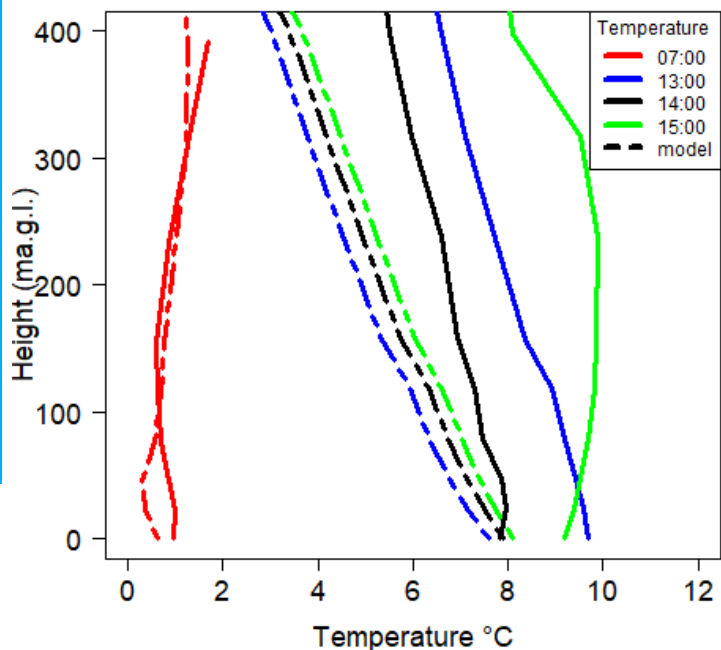
Temperature Milano 23 Feb 2010



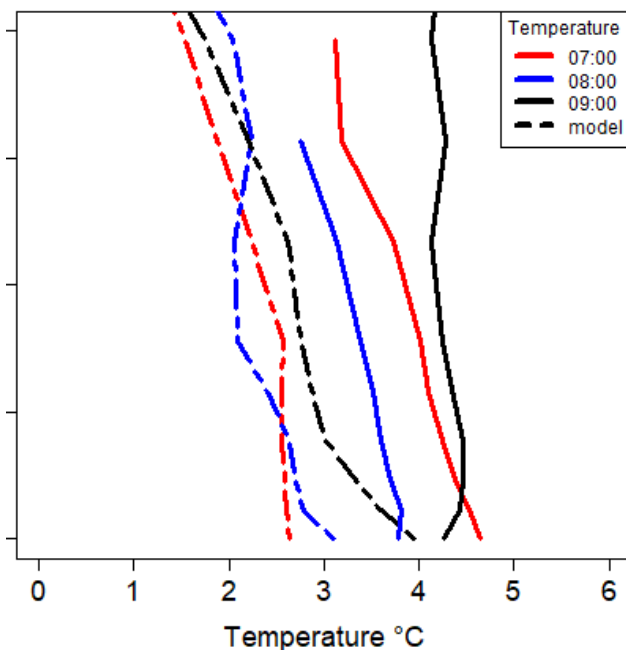
Temperature Milano 24 Feb 2010



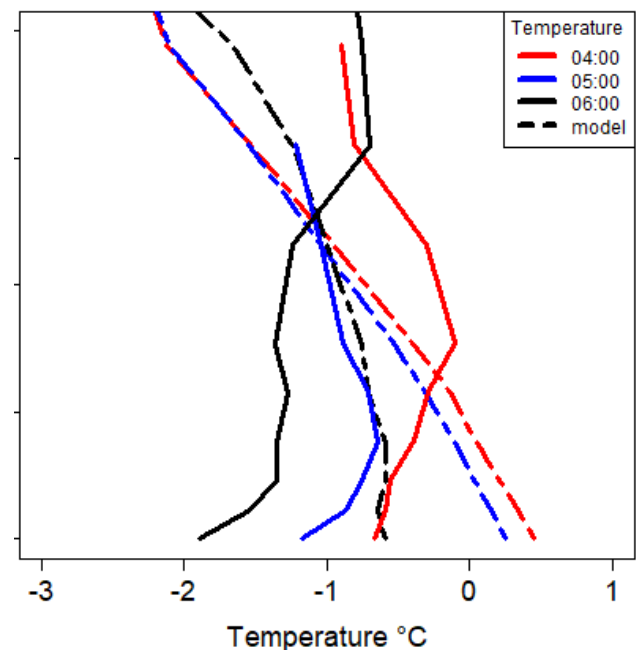
Temperatura Terni 28 Jan 2010



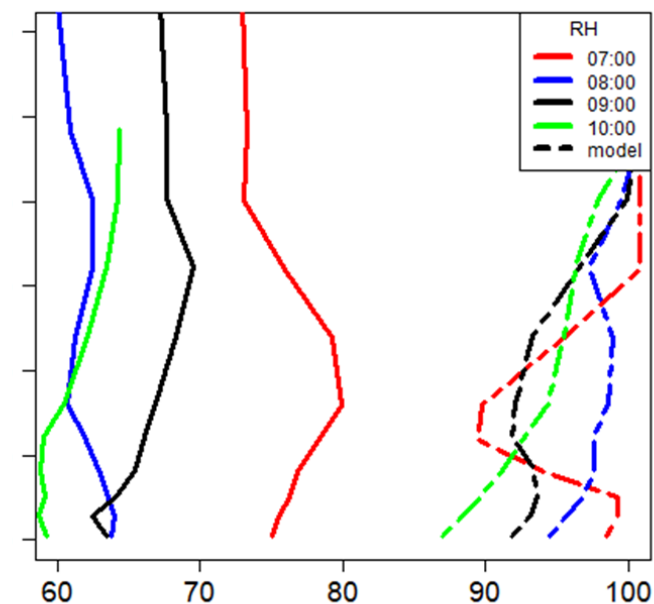
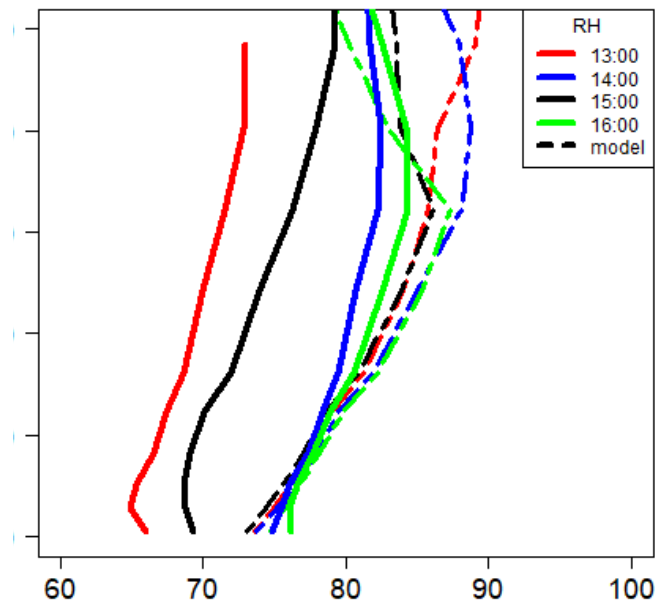
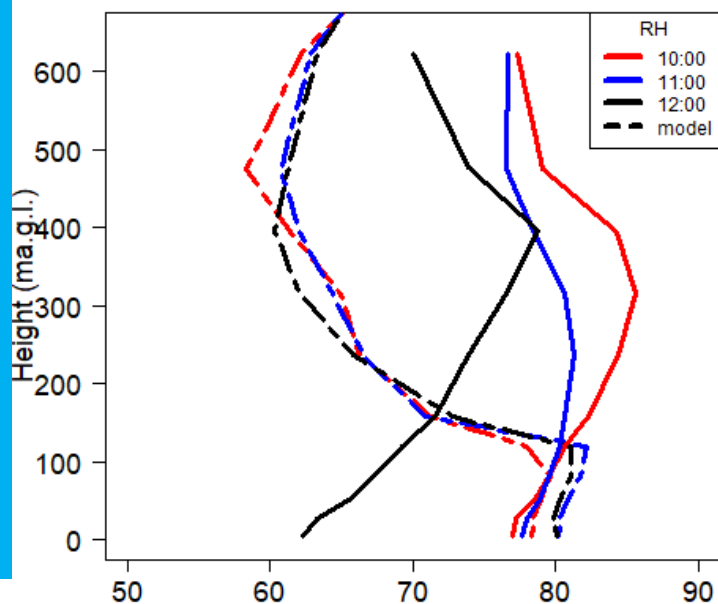
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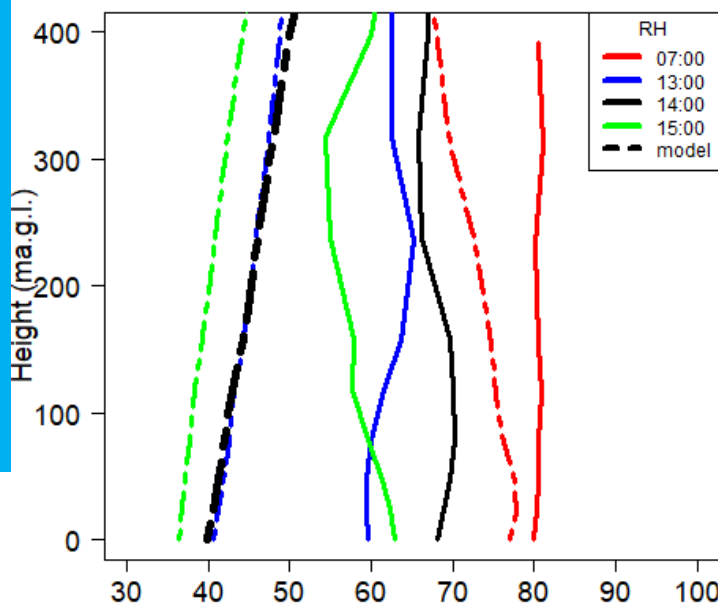
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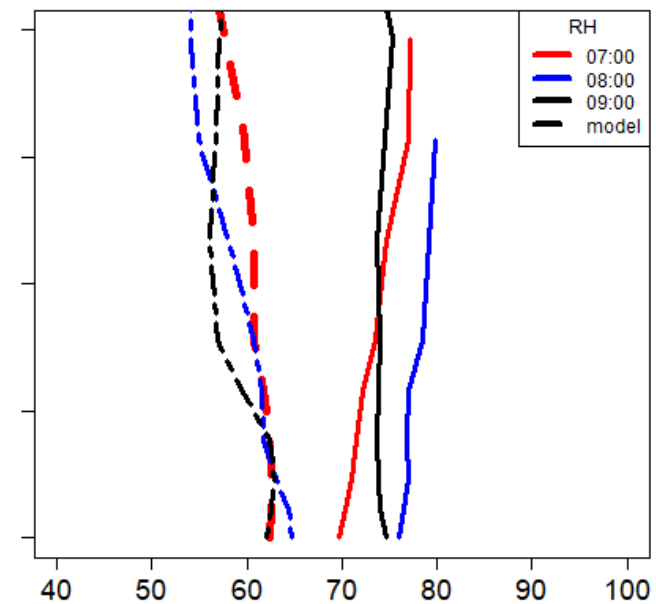
Relative Humidity Milano 15 Feb 2010 Relative Humidity Milano 23 Feb 2010 Relative Humidity Milano 24 Feb 2010



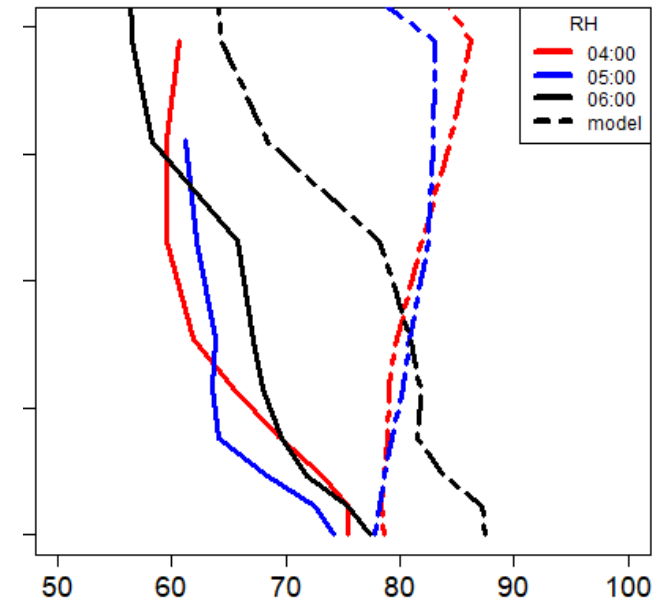
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Relative Humidity Terni 29 Jan 2010



Relative Humidity Terni 02 Feb 2010

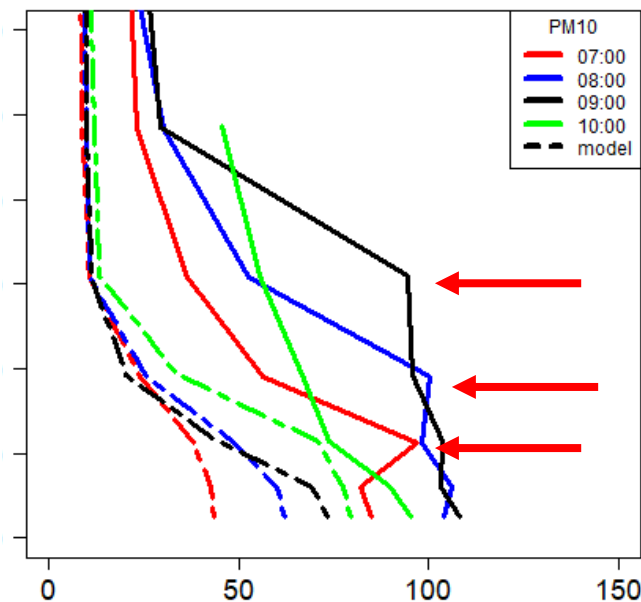
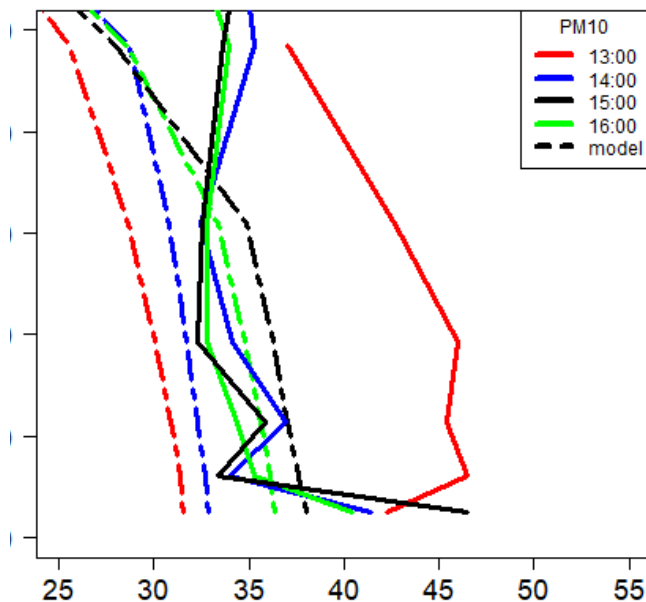
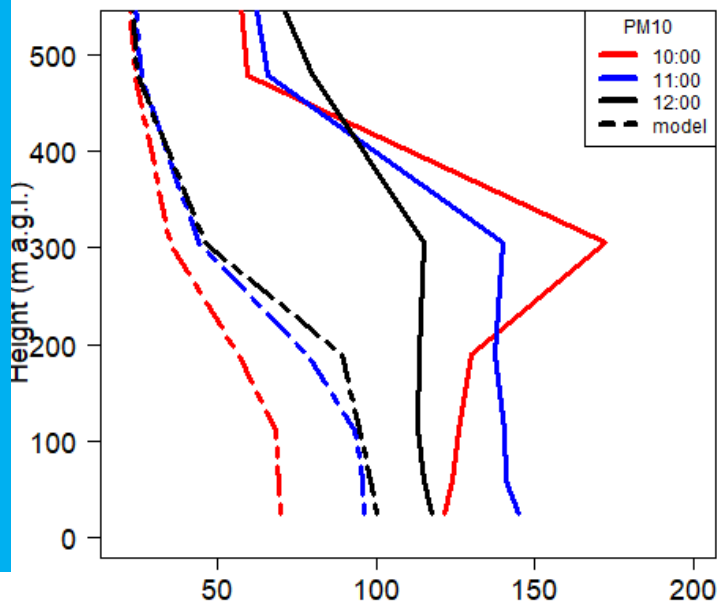


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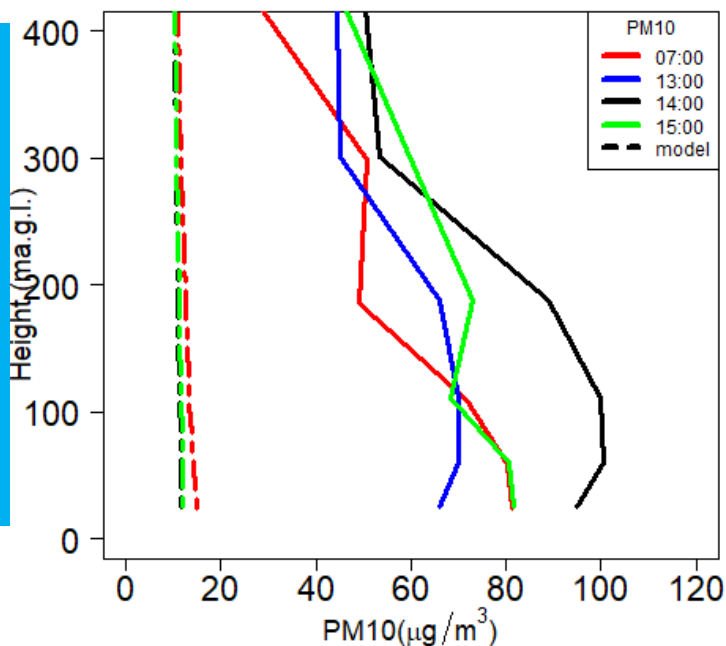
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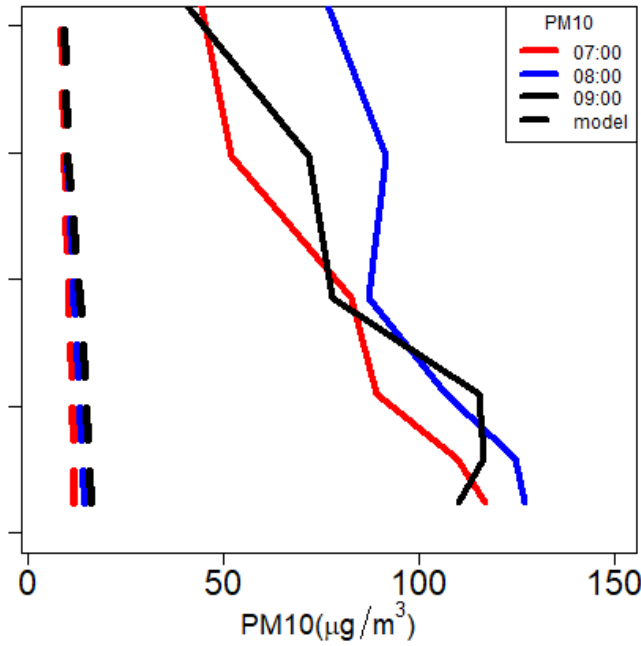
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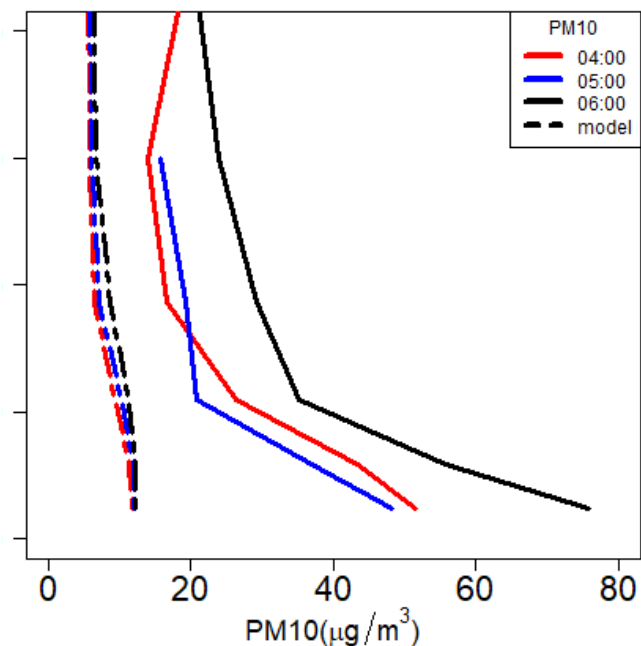
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PM10 Terni 29 Jan 2010



PM10 Terni 02 Feb 2010



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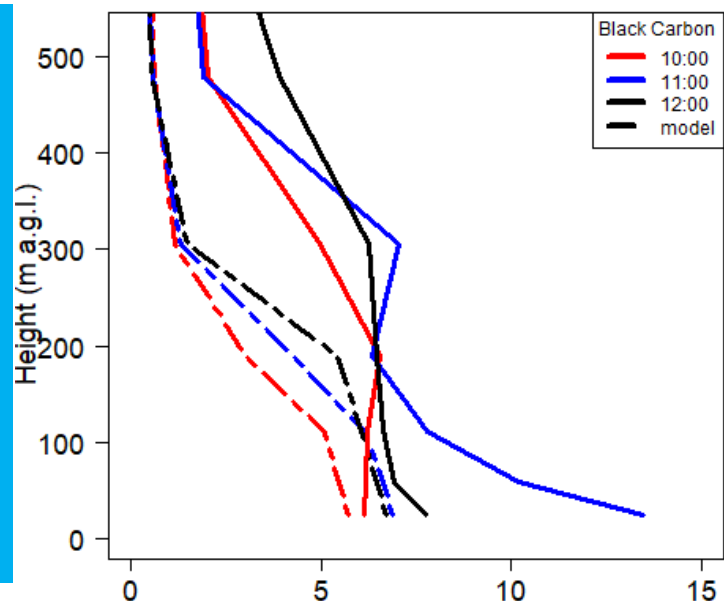
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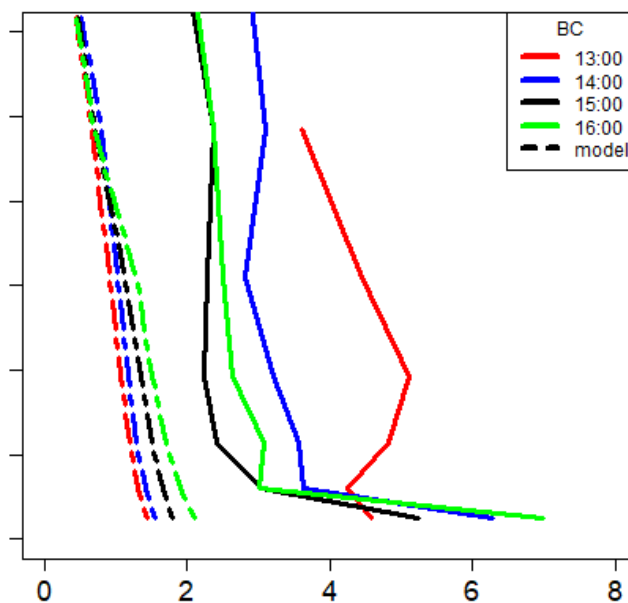
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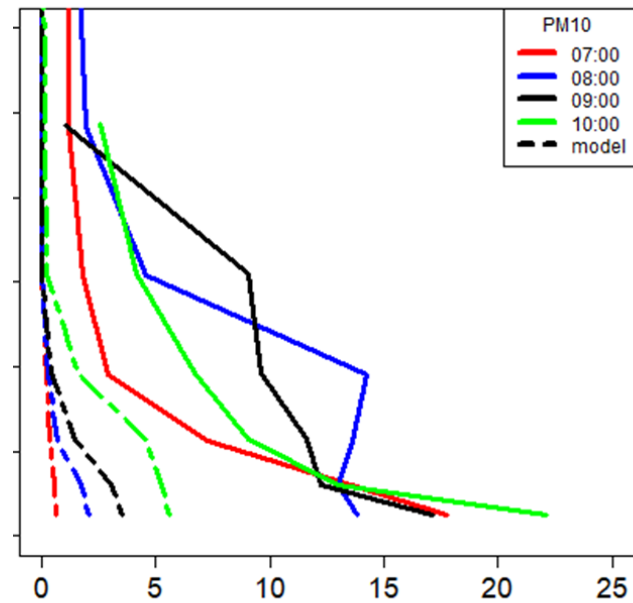
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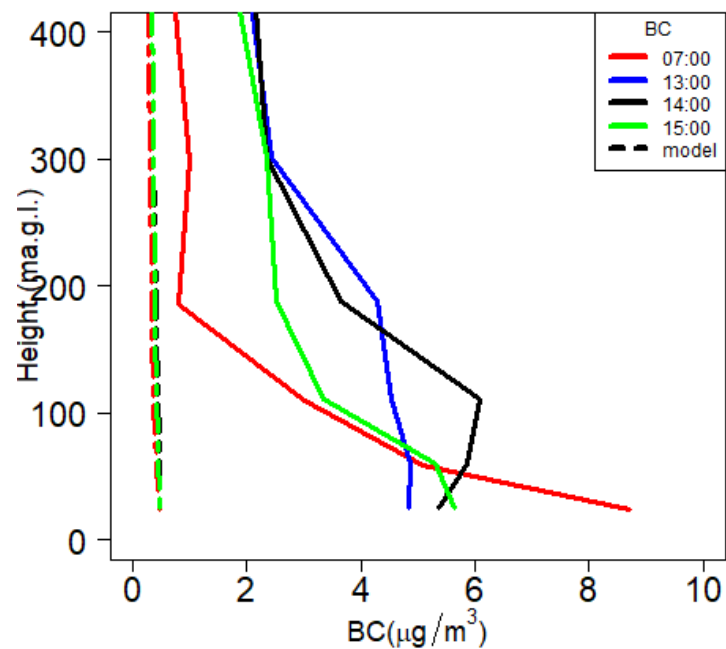
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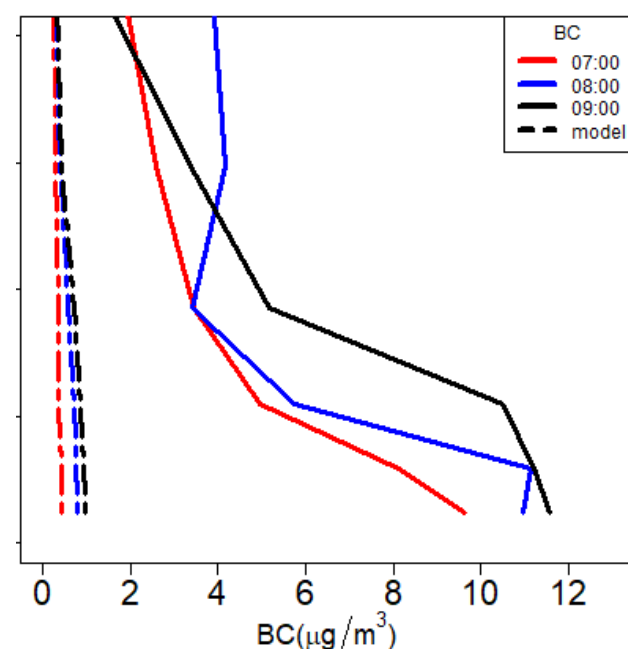
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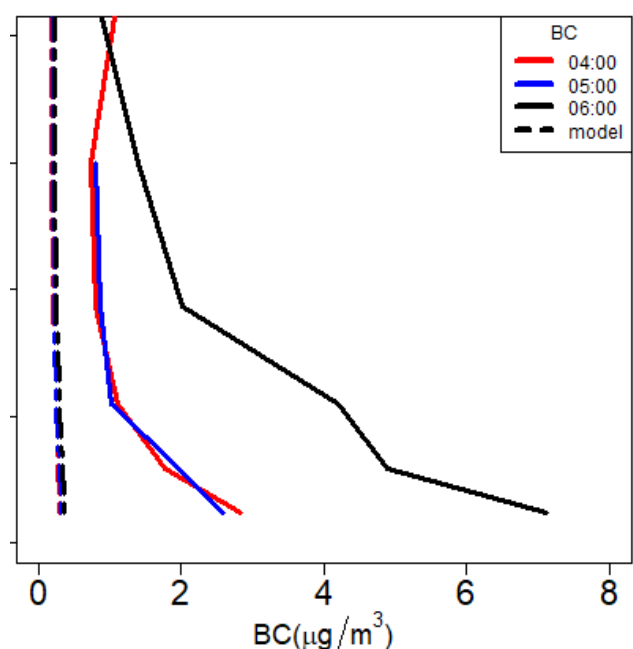
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BC Terni 02 Feb 2010





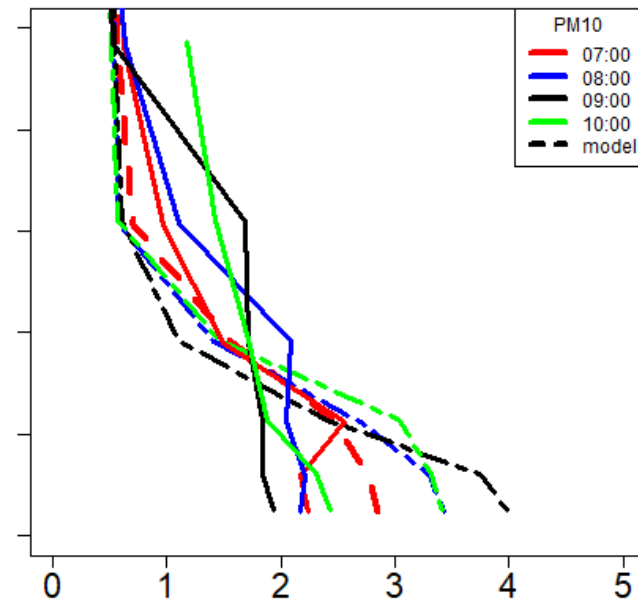
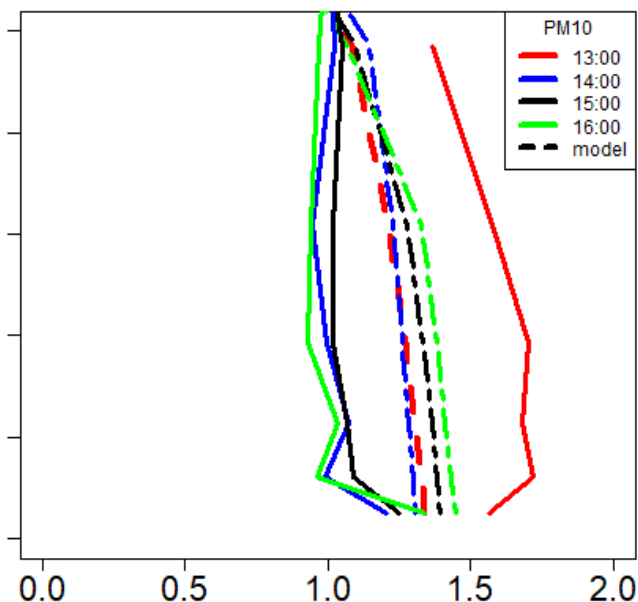
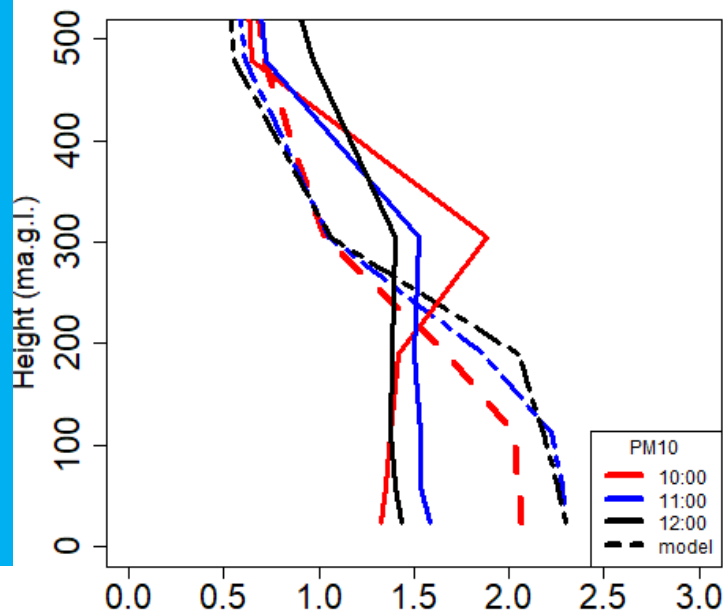
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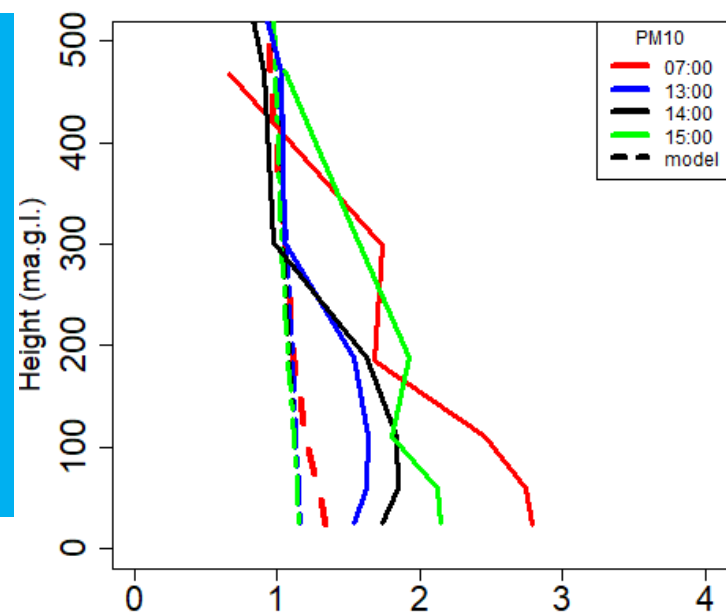
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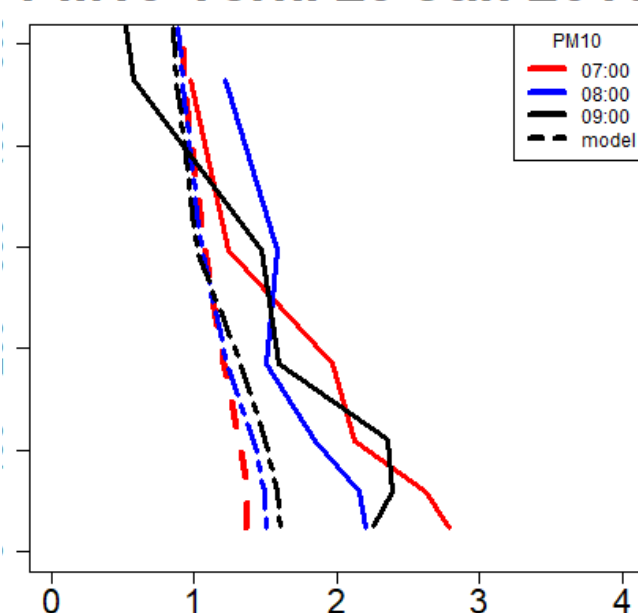
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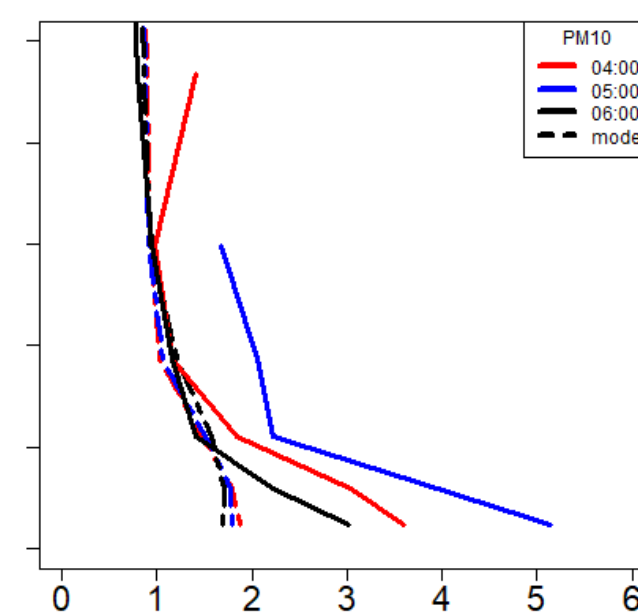
PM10 Terni 28 Jan 2010



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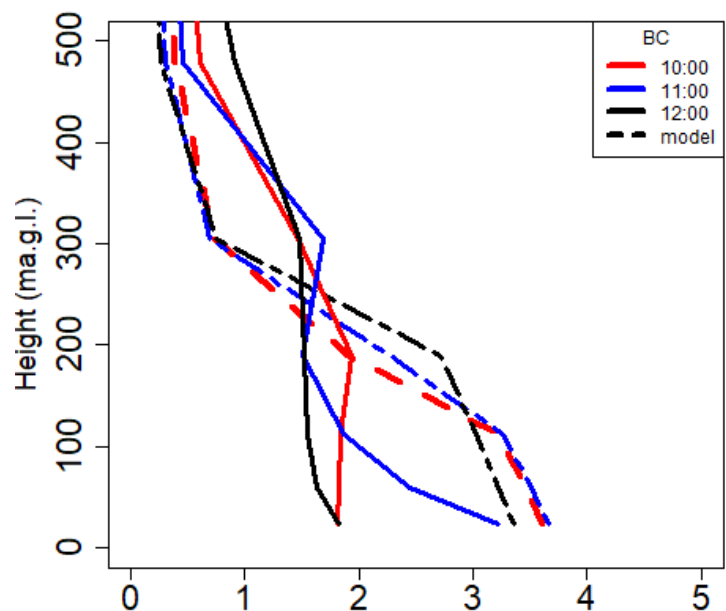
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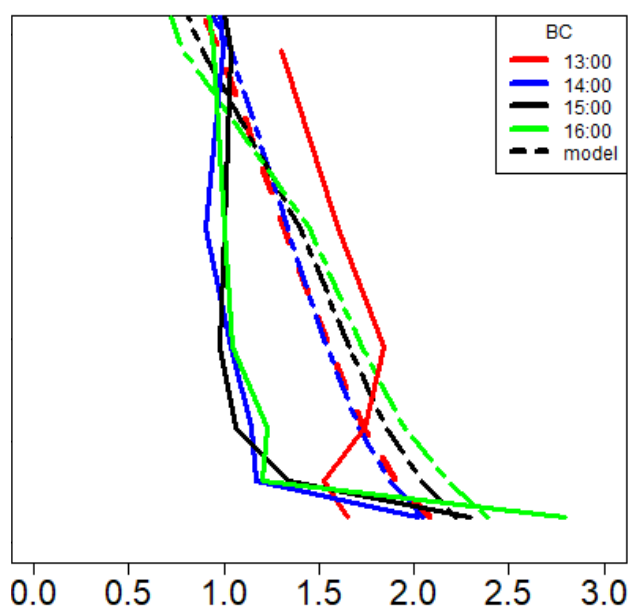


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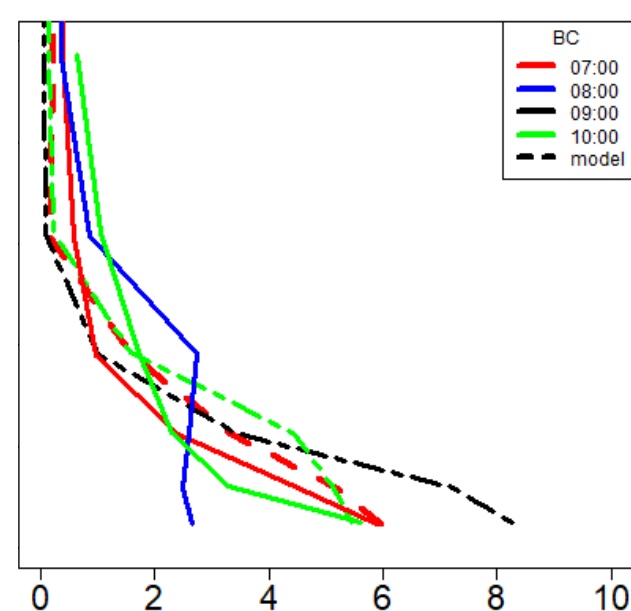
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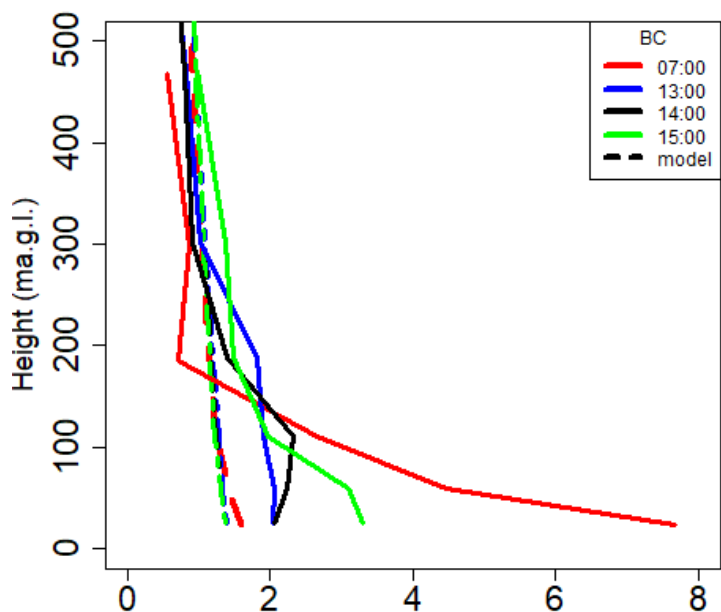
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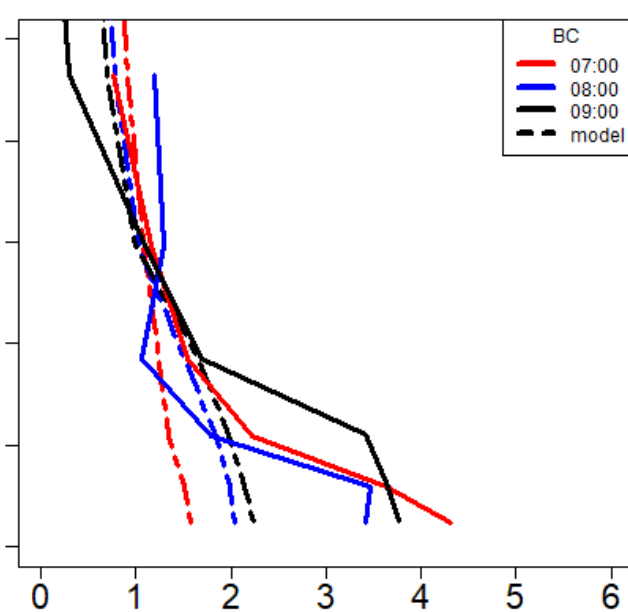
BC Milano 24 Feb 2010



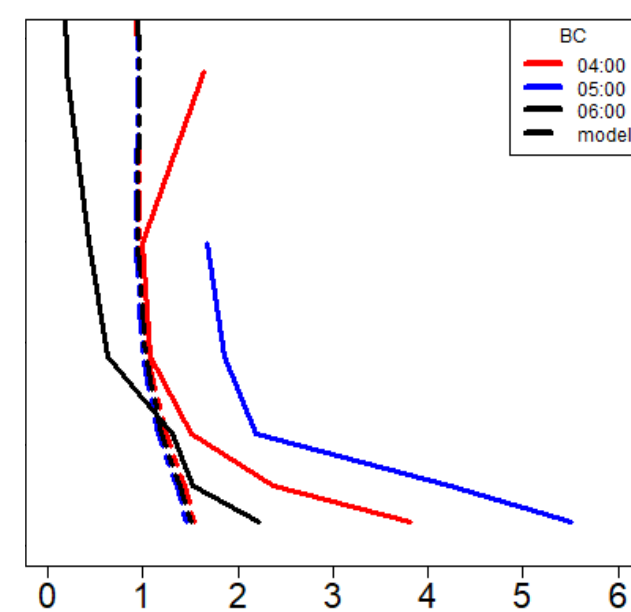
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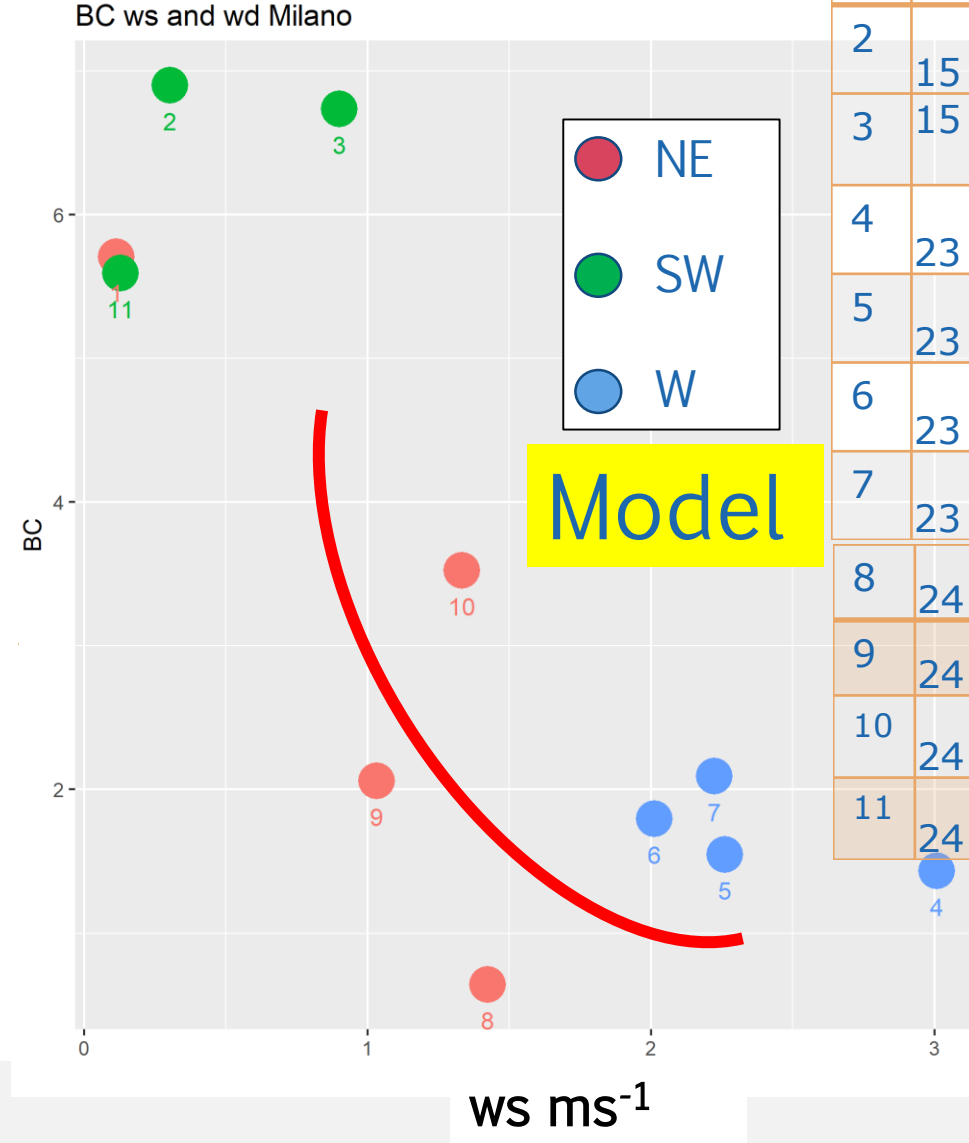
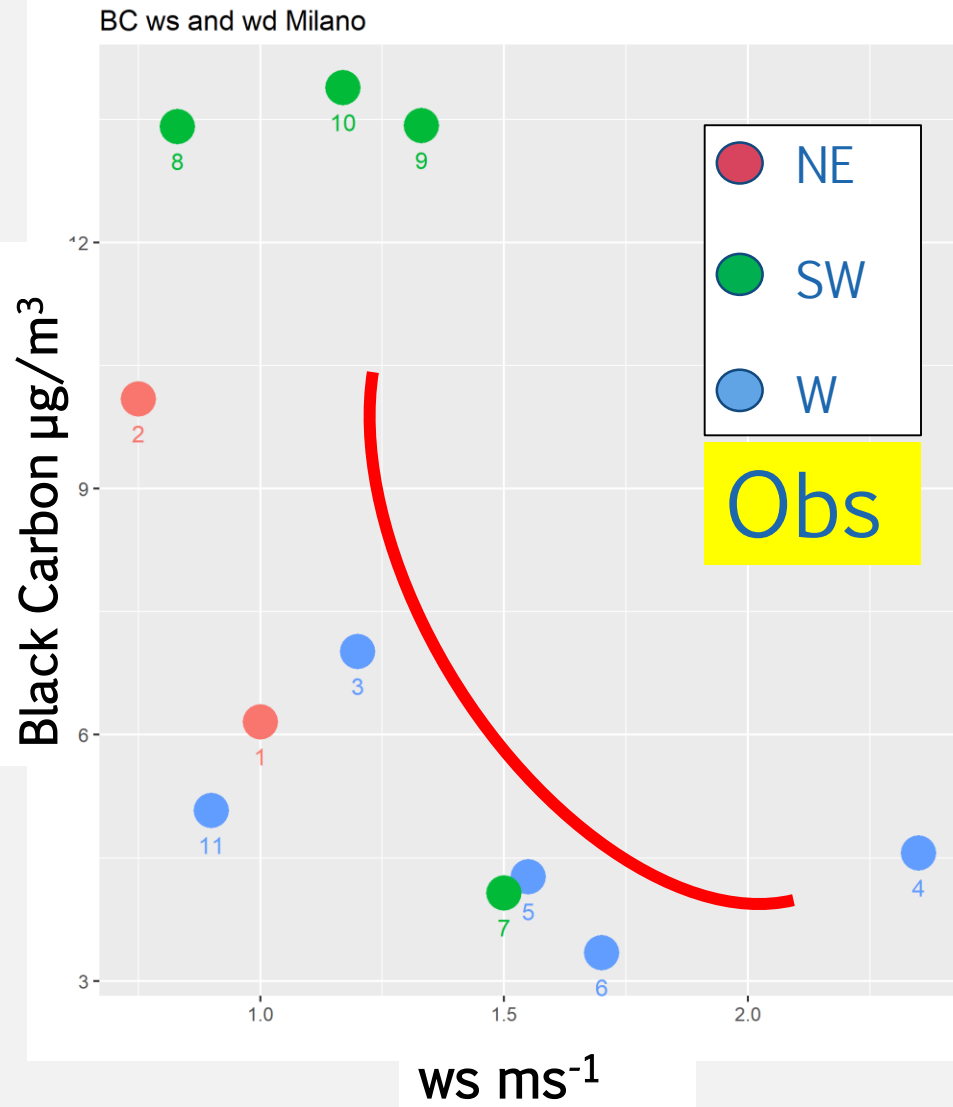
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Ws vs BC and wd (Milano)

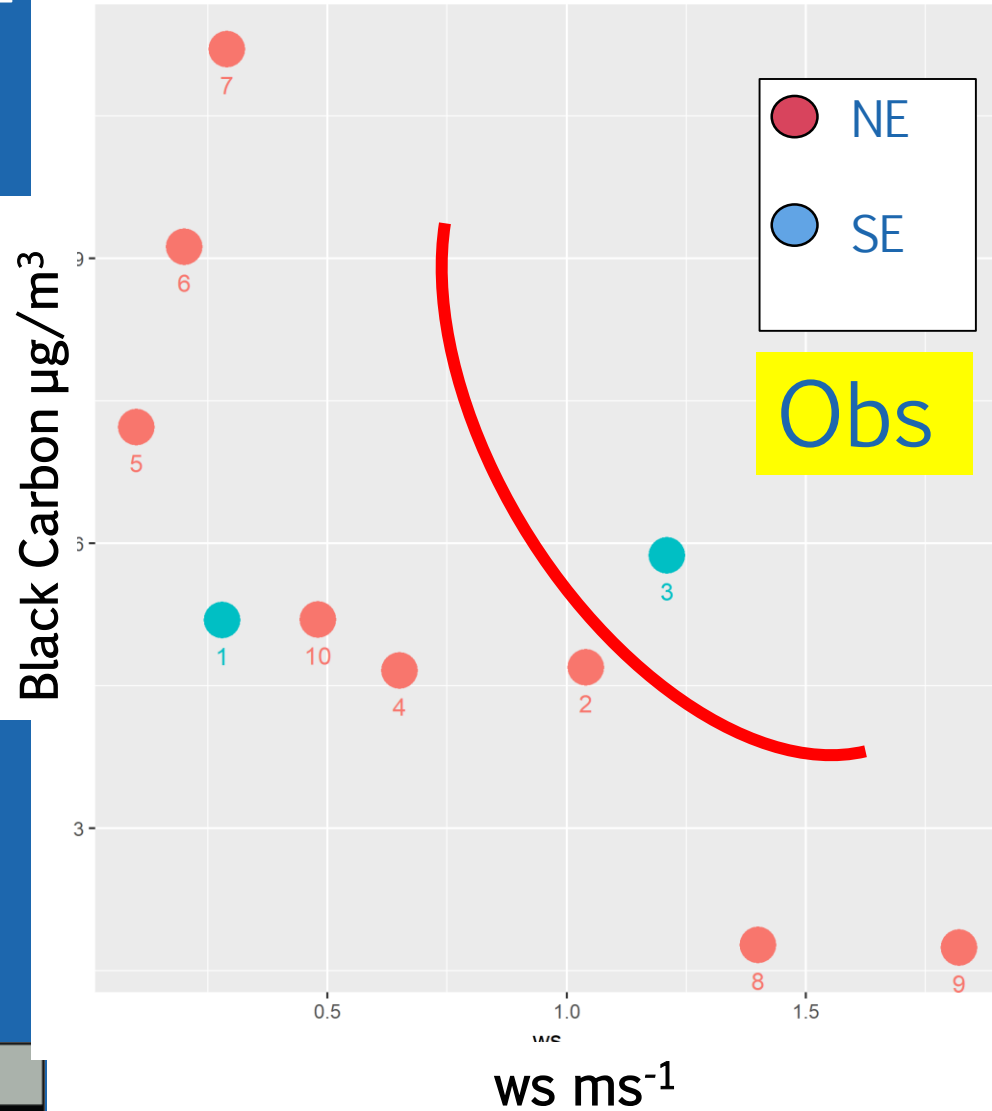


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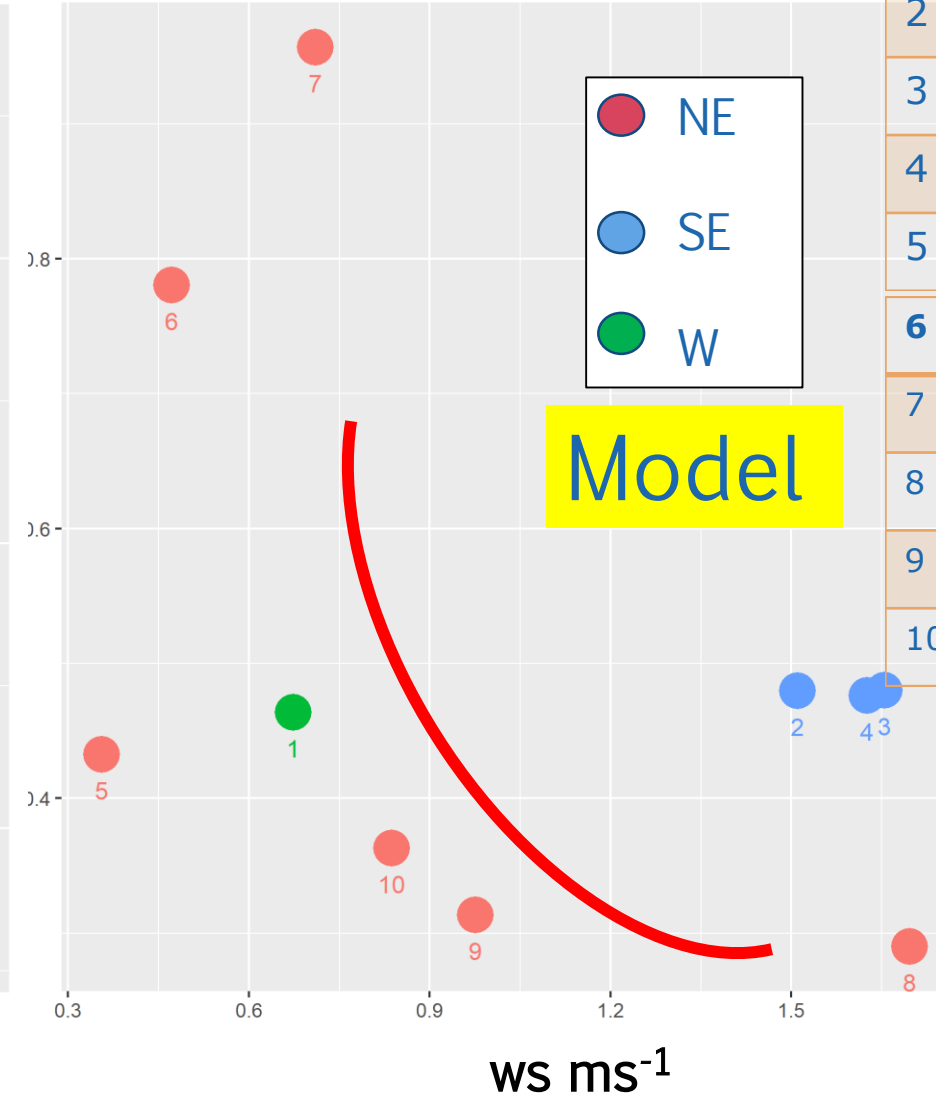


Ws vs BC and wd (Terni)

BC ws and wd Terni



BC ws and wd Terni



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7	29 Jan 09:00
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9	02 Feb 05:00
10	02 Feb 06:00



Conclusions



- Problemi nei primi livelli verticali del modello
- Problemi nell'accuratezza di riproduzione delle concentrazioni di PM10 e BC nel modello



- Il comportamento dei profili verticali è simile per i dati osservati e per il modello
- Buona correlazione di BC e wd (dove si trovano le industrie)
- Studio innovativo nelle valli italiane

Altri Test con una parametrizzazione diversa di PBL e una risoluzione verticale più elevata vicino alla superficie in WRF.



Grazie per l'attenzione!

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