The Adige Valley is one of the main corridors connecting the Po Plain with the inner Alps. It displays a gradually sloping floor along the 150 km path connecting the valley outlet into the plain, near the city of Verona, to the upper valley at Merano. Several weather stations are operated along the Adige Valley, providing regular measurements of the main atmospheric variables, such as air temperature, atmospheric pressure, wind speed and direction. An analysis is performed on time series of these data for the years 2012-2014, based on a selection, by means of objective criteria, of days in which favorable weather conditions allowed a full development of valley winds. These criteria were suggested by previous climatological investigations of valley winds and sea breezes (e.g. Dreiseitl et al. 1980):

- global daily solar radiation is > 50% of the maximum daily radiation measured in that month;
- up-valley wind with WS > 2 m s\(^{-1}\) for at least 2 hours between 9 and 19 LST;
- down-valley wind or WS < 1 m s\(^{-1}\) for most of the hours between 0 and 8 LST;
- diurnal pressure range < 8 hPa.

58 «valley wind days» were identified following these criteria. Pressure data were normalized supposing identical average pressure in the 3 years analyzed at all the weather stations.

### 3. Wind Cycles

A weak up-valley wind south of Trento, due to the presence of the urban heat island (UHI), was simulated with the WRF model in Giovanniini et al. (2014). From Fig. 5:

- \( T_0 = 0.001 \text{ K m}^{-1}, z = 100 \text{ m} \)
- \( T_1 = -0.039 \text{ K m}^{-1} \)

Supposing a hydrostatic pressure distribution and a linear temperature profile:

\[
p_0 = p(z) \left( \frac{z - T_0}{T_1} \right) \frac{\partial T}{\partial p}
\]

with \( p(z) = 975 \text{ hPa} \) and \( T(z) = 293.15 \text{ K} \)

It results \( p_{aw} = 986.43 \text{ hPa} \) and \( p_{uw} = 986.51 \text{ hPa} \).

This pressure difference may be the cause of the «urban breeze» simulated at Trento and observed at Bolzano.

### 5. Urban Effects

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