SECONDARY SCHOOL
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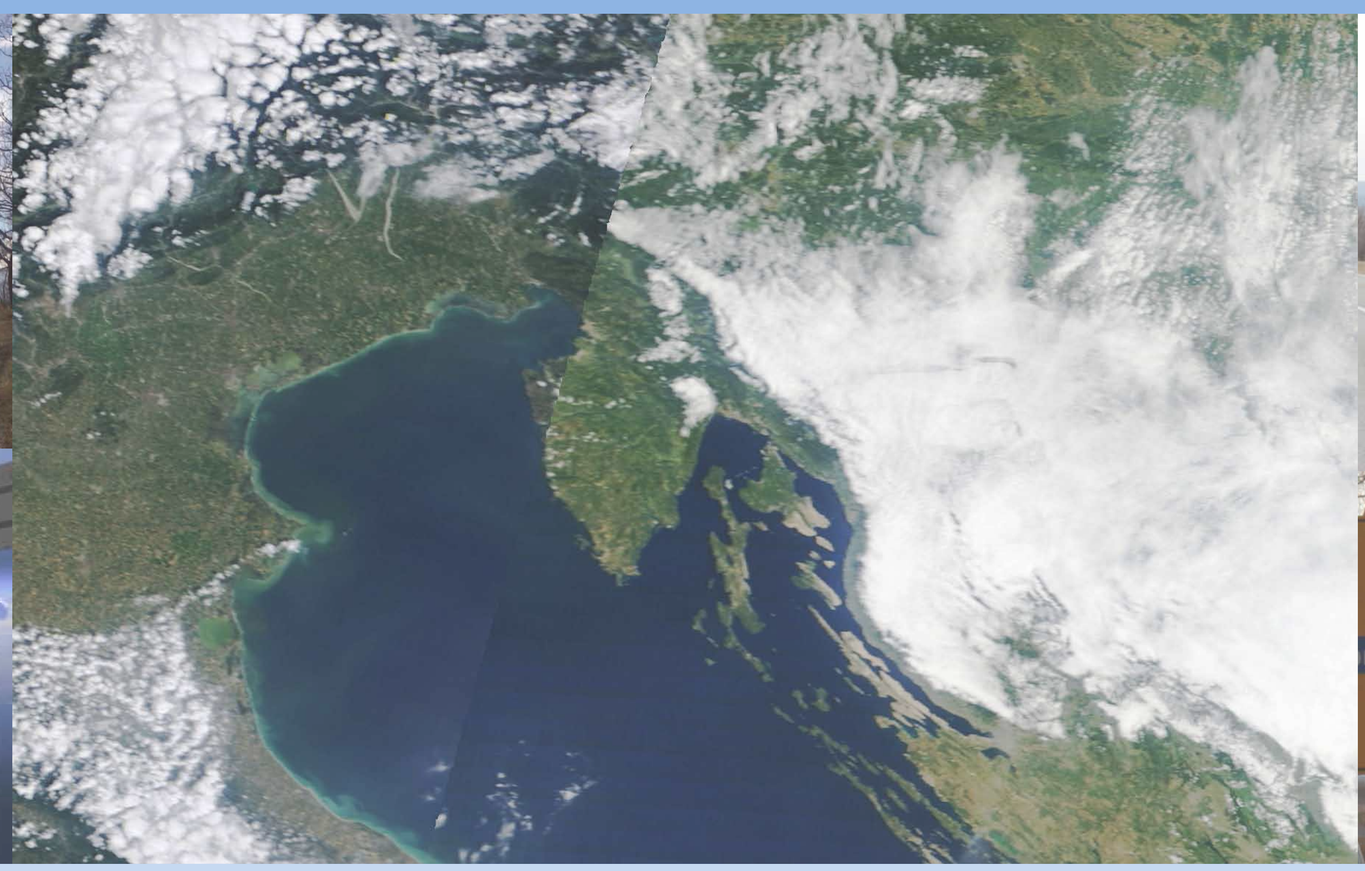
Bora in Vipava Valley

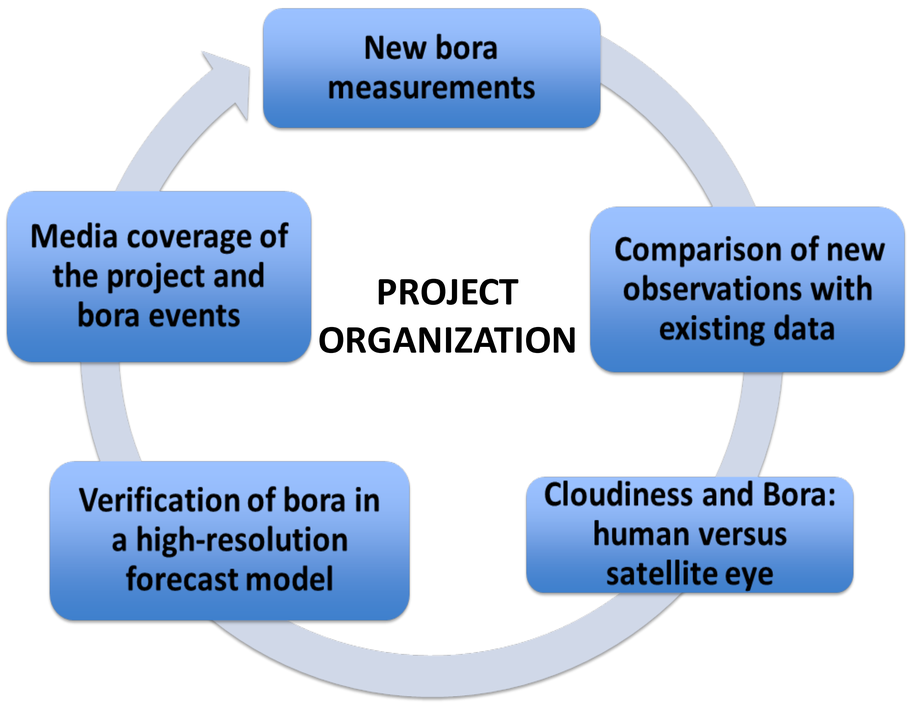
Satellite and Ground-based Observations



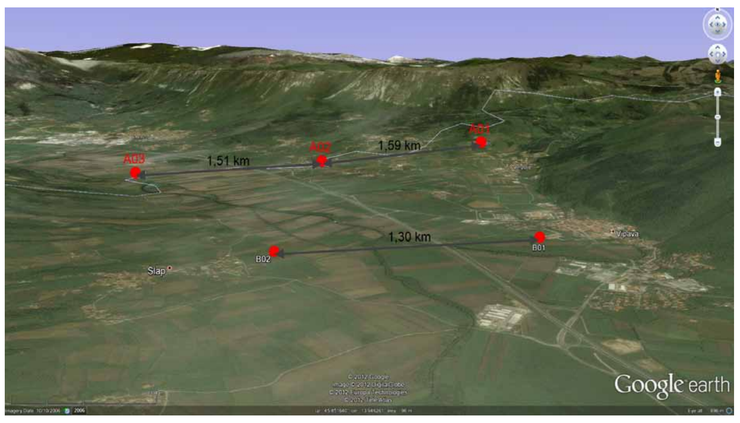
Bora is a strong and severe wind of great impact in the south-western region of Slovenia, in particular the Vipava valley. While waiting for the first satellite observations of wind profiles to describe the vertical bora structure, we have observed cloudiness accompanying the bora events and compared it with our own pictures in winter 2012. We installed new measurement sites along the slopes of orography and collected unique observations of bora variations in the direction of the flow.

Background

Satellite observations of the atmosphere are built into the daily operational forecasting practice. However, space-borne observations of wind profile are still missing over many regions including Slovenia. Without satellite winds, we observed bora from the ground. Satellites observe cloudiness. On the other hand, local people in the Vipava valley are familiar with the cloudiness developing on surrounding orography in relation to the bora flow. In this project we learnt to understand and sistematically observe cloudiness and later on we compared our photographs with high resolution satellite images.



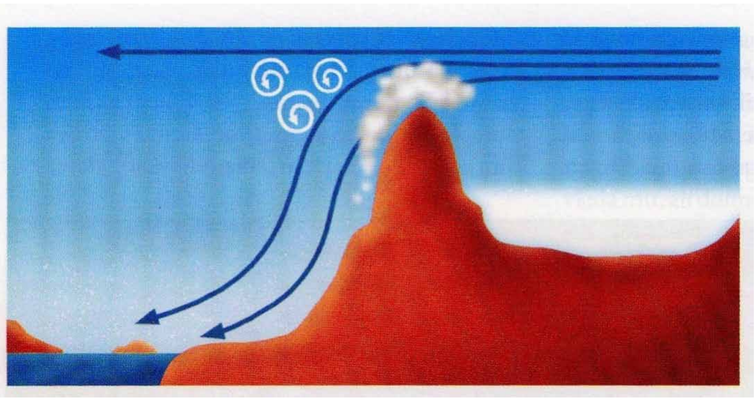
Location of instruments



Locations of five new measurement sites in the Vipava valley along two lines. These are first observations of bora in the direction perpendicular to the Vipava valley orography. Wind gauges were mounted approximately 4 m above the ground.

Bora wind

Bora is a cold north-easterly wind blowing along the eastern Adriatic coast. The main bora characteristics are gusts that occur due to turbulent processes in the flow on the lee side of the mountain.

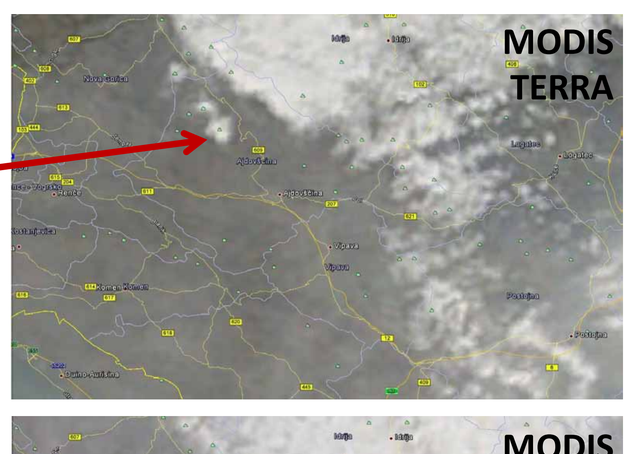


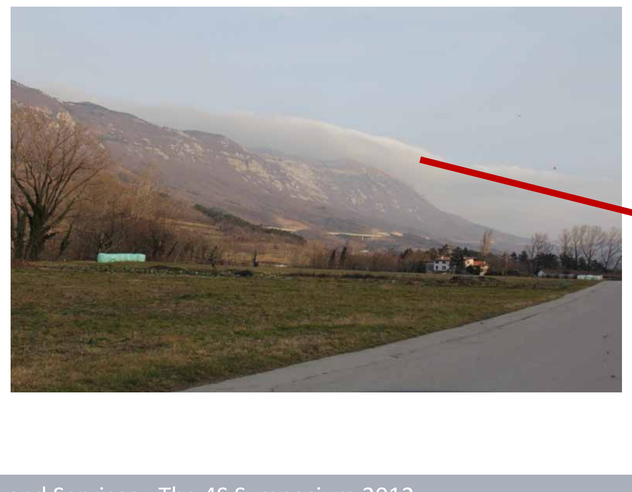
In many situations the arrival of the bora-flow is accompanied by the formation of the cloud close to the mountain top. Such clouds are called »bora cap«.

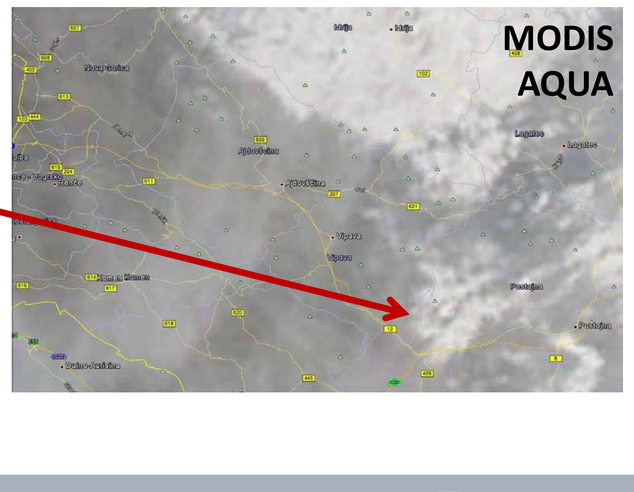
Photographic vs. satellite eye

On a sunny windy day of 29th January 2012 stationary clouds over the orography can be observed by a satellite with a resolution of 250 m.

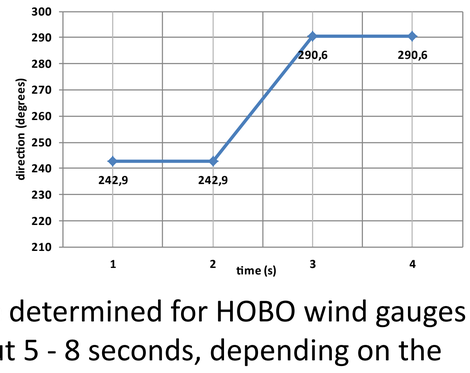
In the morning, “bora cap” over mount Čaven is visible in Modis Terra image (top). In the afternoon, “zastava” cloud over mount Nanos can be seen in Modis Aqua image (bottom).







Calibration of instruments



The response time, which we determined for HOBO wind gauges used in the project, was about 5 - 8 seconds, depending on the wind speed.