Testing of CANARI configuration to determine surface wind characteristics within the ALADIN/SLOVAKIA domain

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In Slovakia we have to periodically evaluate air pollution from our sources (industry, traffic, ...) for some areas of interest and for given time-periods (usually one year). Distribution of surface wind ("wind rose") is needed as input to air pollution dispersion models.

Use of wind roses determined only from surface wind observations (SYNOP) is not satisfactory, due to insufficient data / stations coverage over the domains of interest. Therefore we decided to test the CANARI configuration of ALADIN to improve the description of surface wind within the ALADIN/SLOVAKIA domain. We used hourly model analyses of ALADIN/SLOVAKIA (AL12 version, 7 km resolution), guess (up to 12 hour model forecast, because lateral boundary conditions are accessible twice a day from ALADIN/LACE) and observations from SYNOP stations. We computed CANARI for Slovak synoptic stations (the nearest gridpoint method) to verify it against SYNOP observations.

We ran CANARI for the whole year 2001 and then drew wind roses for our synoptic stations from CANARI and SYNOP data. The accuracy of the wind roses provided by CANARI was checked to examine the potential of CANARI to generate the wind roses in the areas where no observation stations are situated.

Results for the following three stations are given:
  11816 - Bratislava airport
  11952 - Poprad-Ganovce (valley between High and Low Tatras)
  11968 - Kosice airport
Distribution of wind direction is shown on the plots with radial step 5 percent. Angular division is into 16 sectors.
On the left side are raw SYNOP data, on the right side are results from CANARI.

11816 - Bratislava airport