PARAFOG application and strategy

Participants :

- Dr Jean-François Ribaud (PI, IPSL, France)
- Dr Luka Ravnik (SEA, Slovenia)
- Dr Damyan Barantiev (CAWRI-BAS, Bulgaria)
- Marc-Antoine Drouin (LMD, France)

Outcomes :

PARAFOG is a near-real-time decision tool to support nowcasting fog formation events at local scales (Ribaud et al., 2021). It is based on the combination of Automatic-LIDAR-Ceilometer (ALC) observations together with visibility and weather station measurements. Today, PARAFOG version 2 (PFG2), is able to evaluate the fog formation risk for both stratus lowering and radiation fog. PFG2 has been calibrated using several fog seasons across Europe and is experimentally used at Paris international airports (https://www.lmd.polytechnique.fr/sirta/parafog/index.html).

This Virtual Mobility Grant aimed at implementing PFG2 in Bulgaria (Burgas airport) and Slovenia (Ljubljana). Overall PFG2 performed well to anticipate fog formation risk with high alert retrieved several tens of minutes before fog onset. In addition, the order of alerts, ranging from low to moderate and then moderate to high was consistent with local weather analysis (see figure below). Finally, the performance of the alert levels retrieved by PFG2 were assessed in Slovenia. It was found that PFG2 did not miss any fog events as it presents a hit rate of 100%, while the false alarm ratio is about 12%. Following these promising results, future collaborations as well as the way to distribute PFG2 were considered. Also, the possibility to develop a single and unique easy-to-use interface would benefit the scientific community.

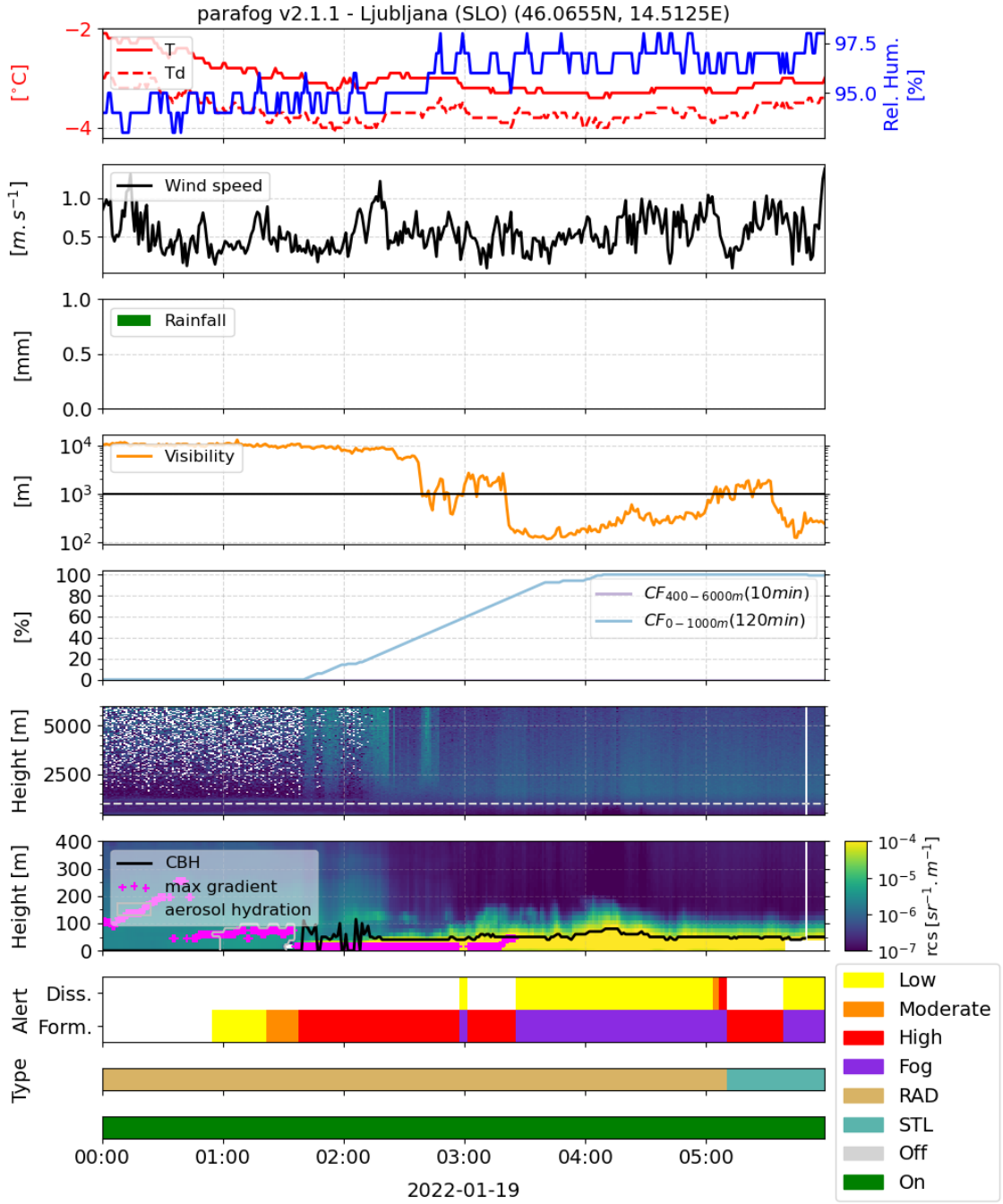

Figure : *Time series presenting measurements and the corresponding retrieved alert level outputs from PARAFOG version 2 during a radiation fog formation on 19 January 2022 at Ljubljana (Slovenia). From top to bottom panels, i) temperature and relative humidity, ii) wind speed, iii) rainfall, iv) visibility, v) cloud fraction between 0-1000m (400-6000m) over the last 2h (1h), vi) ALC-attenuated backscatter between 400 and 6000m, vii) ALC-attenuated backscatter between 0 and 400 m, together with the altitude of the maximum gradient (fuchsia points) and the aerosol hydration (gray contours), viii) alert levels retrieved from PFG2, and viiii) fog type and PFG2 status.*