Figure S1. Absolute vertical wind speed distributions per vertical layers (Blue: 20, Red: 50 and Green: 99). Right: WRF ouputs. Up: WRFW wind strategy, Down: NODIV wind strategy. end of the whiskers represents 10th and 90th percentiles.
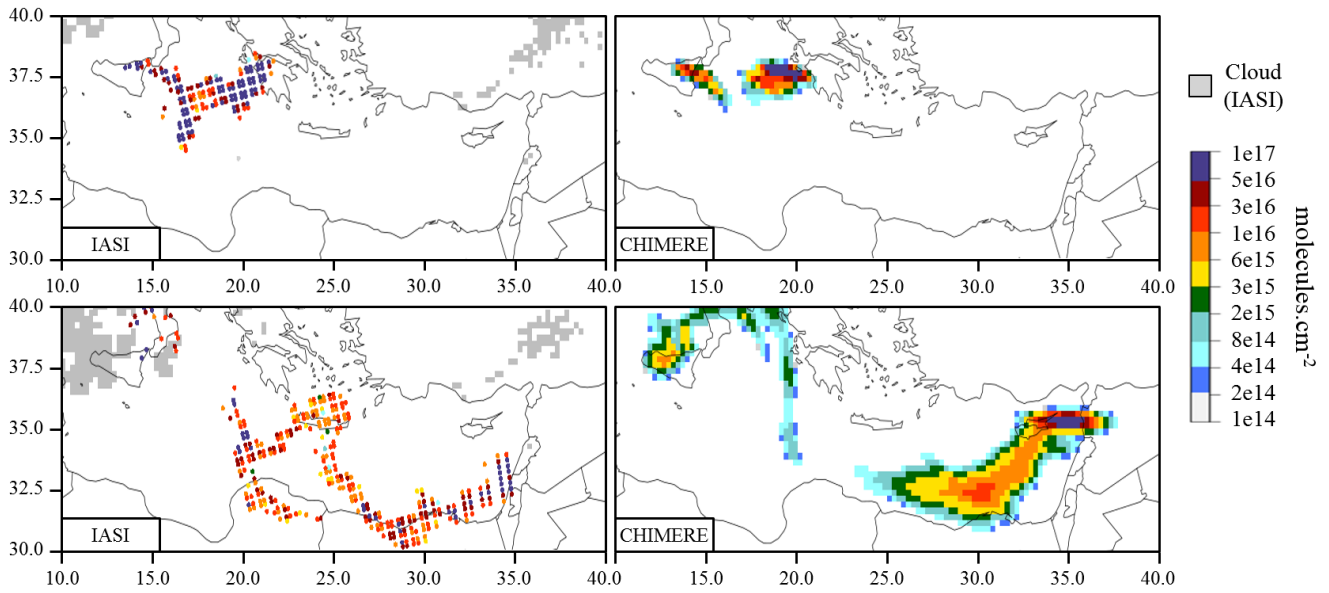
Figure S2. SO_2 plume $(\text{molecules.cm}^{-2})$ from IASI (left) and CHIMERE (right). IASI soundings respectively for march 18 2012 05PM and march 19 05PM UTC. In this example, CHIMERE simulation WRFW-DL-20 is displayed. CHIMERE and OMI data are represented with OMI's $0.25° \times 0.25°$ resolution grid. Clouds are based on Advanced Very High Resolution Radiometer (AVHRR) data for IASI.
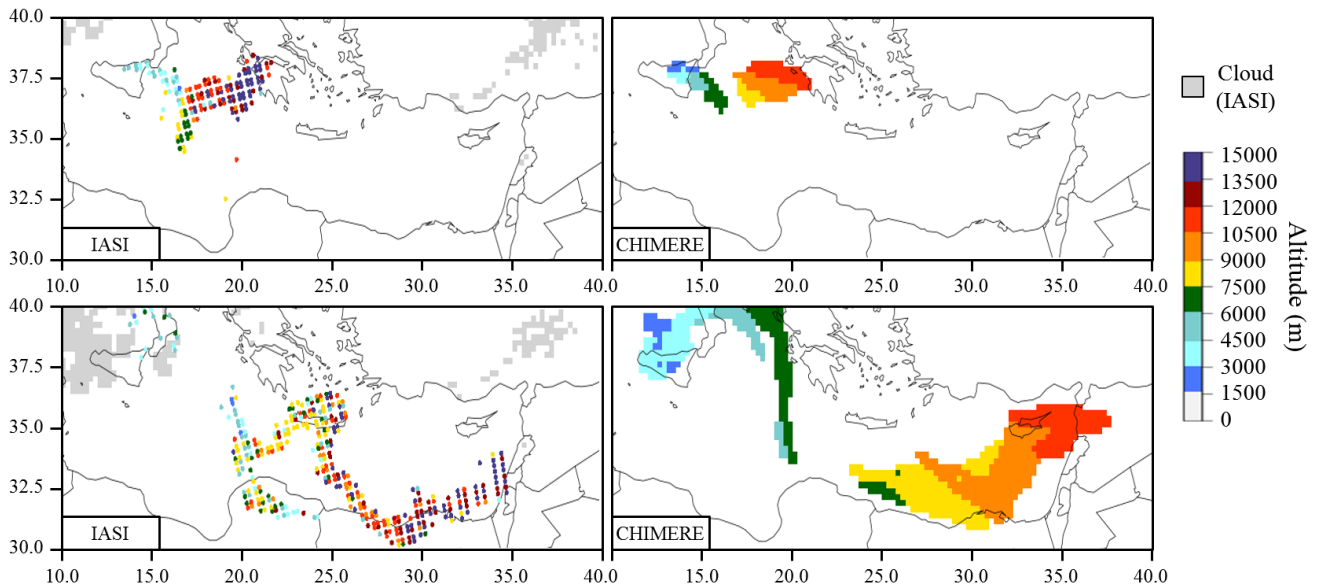

Figure S3. SO_2 maximum concentrations' altitude (meters) from IASI (left) and CHIMERE (right). IASI soundings respectively for march 18 2012 05PM and march 19 05PM UTC. In this example, CHIMERE simulation WRFW-DL-20 is displayed. CHIMERE and OMI data are represented with OMI's $0.25° \times 0.25°$ resolution grid. Clouds are based on Advanced Very High Resolution Radiometer (AVHRR) data for IASI.
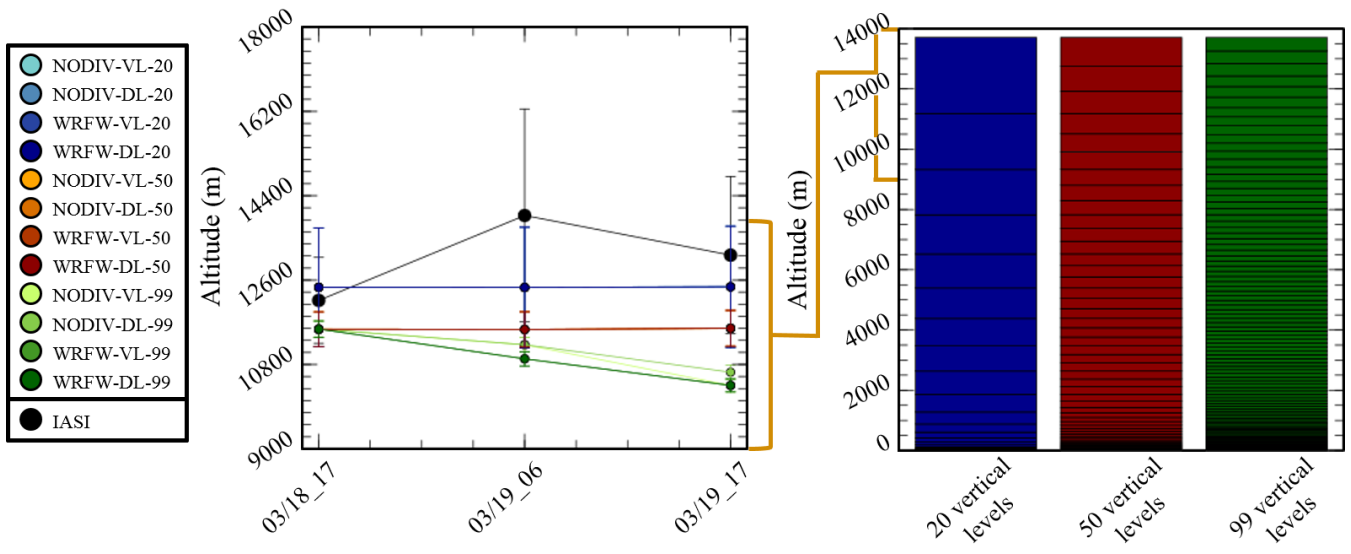
Figure S4. Center : Maximum concentration altitude evolution (IASI and CHIMERE), IASI brackets indicate values' uncertainties and CHIMERE brackets indicates cell's bottom and top. Right : Model vertical levels distribution for the 3 configurations from surface to top.