

## The Mt. Cimone High Elevation Station (2165 m a.s.l., Italy) for atmospheric research

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Mt. Cimone (44°12' N, 10°42' E; 2165 m a.s.l.) is the highest mountain in the northern Italian Apennines which divides two climatologically different regions: continental Europe, with the nearby low-lying Po Valley area on the North, and the Mediterranean Basin on the South. On the top of Mt. Cimone, since 1949 is sited the Observatory of the Italian Air Force Meteorological Service that hosts the "O. Vittori" Station of the Italian National Research Council - Institute of Atmospheric Sciences and Climate (ISAC). The Mt. Cimone station is the only high mountain atmospheric station located South of the Alps and the Po Valley. As being for the most part of the year above the boundary layer, this measurement site is not directly influenced by anthropogenic pollution. The site is characterized by a 360° free horizon covering a surface of 120,000 km<sup>2</sup> and without near higher orographic obstacles, thus Mt. Cimone represents a strategic platform to study the chemical and physical characteristics and climatology of the free troposphere in the South Europe and North Mediterranean basin. In particular, the experimental activities carried out at the Station helps to better assess the contribution of short and long-range air mass transport events (e.g. air mass export from the planetary boundary layer, stratospheric intrusion events, mineral dust and biomass burning plume transports, long-range pollutant transports) in influencing the background composition of the atmosphere and the free troposphere.

A wide set of atmospheric measurements, within several national and international projects for the study of the atmosphere composition and climatic changes, has been established at the Mt. Cimone station thanks to a close collaboration with Italian Air Force Meteorological Service and with other research Institutions and Universities (Bologna, Urbino, Milan and Ferrara Universities; ARPA Emilia Romagna; JRC Ispra; Ev-K2-CNR Committee; Centre National de la Recherche Scientifique, Leibniz Institute for Tropospheric Research). In particular, continuous measurements of trace gases (O<sub>3</sub>, CO, H<sub>2</sub>, HFCs, HCFCs, CFCs, total O<sub>3</sub>, total and tropospheric NO<sub>2</sub>), aerosol physical and optical properties (size distribution, black carbon content, total scattering coefficient) as well as solar radiation (total and UVB) are carried out at the "O. Vittori" Station. Moreover not continuous PM<sub>10</sub> and PM<sub>1</sub> sampling are performed in order to investigate chemical and radiochemical aerosol composition. Meteorological observations have been performing at the Italian Air Force meteorological Observatory simultaneously to continuous measurement of CO<sub>2</sub> concentration since 1979 which represents the longest time series of CO<sub>2</sub> recorded in background conditions over the European continent.

During the last years, in the framework of different International projects (i.e. VOTALP 1, VOTALP 2, STACCATO, MINATROC, EUCAARI, AEROCARB, SOGE, CARBOEUROPE, ACCENT, EUSAAR, AGAGE), several European scientists used the "O. Vittori" facilities to better investigate chemical-physical processes affecting the free troposphere background conditions. Besides being part of the SHARE (Stations at High Altitude for Research on the Environment) network, this station is actually part of the GAW-WMO programme as regional station, EUSAAR EU project as supersite for aerosol measurements, and AGAGE as associated station. More recently the "O. Vittori" station has been inserted in the CEOP network.

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