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# Continuous atmospheric 222Rn concentration measurements to study surface-air exchange at the station of Gredos and Iruelas, in Central Spain

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The Gredos and Iruelas station (GIC3) is part of the ClimaDat IC3 network (http://climadat.es/). This station is located in the Gredos Natural Park at a latitude of 40.22º N and a longitude of -5.14º E in the Spanish central plateau. The ClimaDat network is made by 8 stations distributed around Spain and it has been developed with the aim of studying climatic processes and the responses of impacted systems, at different time and space scales.

Since November 2012, measurements of $CO_2$, CH4, and of the natural radioactive gas 222Rn are continuously performed at GIC3 station at 20 m agl and at 1100 m asl . Maximum,minimum and average values of meteorological parameters, such as ambient air humidity and temperature, wind speed and direction are also measured at GIC3 station.

Particularly, the concentration series of 222Rn measured at GIC3 station are extremely useful to evaluate the exchange of this noble radioactive gas between the soil surface and the lower troposphere in this area, under different weather situations and environmental conditions.

The Gredos Natural Park is located in a granitic basement and this type of soil presents a high porosity and permeability. Furthermore, granitic materials have high activity levels of 228U. These factors enable large amount of radon to escape from the deeper soil, giving radon flux values of 90-100 Bq m-2 h-1 . These radon flux values are much higher than the average radon flux over the Earth, which is about 50 Bq m-2 h-1 (Szegvary et al, 2009).

On the other hand, this geographical area is frequently affected by snow and rain events which drastically reduce the local radon exhalation. It is also influenced by winds coming from the Atlantic Ocean, which are poor in radon and strong, causing an important mixing. In addition, the cold nights' stability leads to an observed nocturnal radon accumulation.

All the aforementioned conditions influence atmospheric radon concentrations measured at the GIC3 station, enlarging the range of the measured interval to be between 1 and 35 Bq m-3. The dynamics of the atmospheric radon concentrations measured at the GIC3 station is related in this work with wind sources and air stability.