

**Middle-atmosphere dynamics observed with
a portable muon detector**

DOI: 10.1029/2019EA000655

M. Tramontini^{1,2}, M. Rosas-Carbajal³, C. Nussbaum⁴, D. Gibert⁵, J. Marteau¹

1: Institut de Physique Nucléaire de Lyon, UMR 5822, CNRS-IN2P3, Université de Lyon, Université Claude Bernard Lyon 1, France

2: CONICET – Facultad de Ciencias Astronómicas y Geofísicas, Universidad Nacional de La Plata, Argentina

3: Université de Paris, Institut de Physique du Globe de Paris, CNRS, UMR 7154, F-75238 Paris, France

4: Swiss Geological Survey at swisstopo, Seftigenstrasse 264, CH-3084 Wabern, Switzerland

5: Univ. Rennes, CNRS, Géosciences Rennes, UMR 6118, F-35000, Rennes, France

Additional Supporting Information (Files uploaded separately)

1. Muon data set (large Table S1).

Introduction

This supporting information provides the muon data set used in our analysis. It corresponds to the 382 days that our portable muon detector acquired data in the Mont Terri Underground Rock Laboratory (URL), between October 2016 and February 2018. The data set is presented in Data Set S1.

Data Set S1. Muon data set.

The data set contains the average muon rate, R , and the deviation from mean of R , $\Delta R / \langle R \rangle$. Given that we perform a linear regression between the relative muon rate and effective temperature variations, we also present the deviation from mean of the average effective temperature, $\Delta T_{eff} / \langle T_{eff} \rangle$. The uncertainties in these parameters are represented by $\sigma(R)$, $\sigma(\Delta R / \langle R \rangle)$ and $\sigma(\Delta T_{eff} / \langle T_{eff} \rangle)$. As described in the Methodology section of the paper, R is computed using a 30-day width Hamming moving average window. $\Delta T_{eff} / \langle T_{eff} \rangle$ is derived from the ERA5 data set offered by the European Centre for Medium-range Weather Forecast (ECMWF), available from <https://www.ecmwf.int/>.