

MIROVA DATABASE (v.1)

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The MIROVA DATABASE (v.1) includes time series of thermal flux (Volcanic Radiative Power; VRP in Watt) radiated into the atmosphere from **111 volcanoes** around the world in the period from **March 1, 2000 and December 31, 2019**. The dataset was elaborated from **nighttime data** acquired by the **MODIS sensor** and elaborated through the **MIROVA algorithm**. The archive is available in a dedicated repository at: <https://osf.io/zm62w/>

For further information and use of the database, please refer to the companion publication:

Coppola, D., Cardone, D., Laiolo, M., Aveni, S., Campus, A., Massimetti, F. (2023). Global radiant flux from active volcanoes: the 2000-2019 MIROVA Database. *Front. Earth Sci.* 11:1240107. doi: [10.3389/feart.2023.1240107](https://doi.org/10.3389/feart.2023.1240107)

Contents of the Database

The database is composed of three datasets characterized by different time resolution:

- **[Global_Annual_VRE_v1.xls](#)**. Global annual version of the database. The file contains 111 rows (corresponding to volcanoes) and 20 columns giving to the annual Volcanic Radiative Energy (VRE, in J y⁻¹) recorded from 2000 to 2019, calculated using the Method-2. In the absence of thermal anomalies over the course of an entire year the VRE value is set to 0. The table includes the compositional group and the SiO₂ content (wt%) attributed to each volcano according to the indicated bibliographic reference (see below)
- **[Global_Daily_VRP_v1.xls](#)**: Global daily version of the database. The file contains 111 rows (corresponding to volcanoes) and 7245 columns giving the maximum VRP (in W) recorded daily at each volcano from March 1, 2000 to December 31, 2019. We refer to this value as VRP_{day}. In the absence of thermal anomalies over an entire day, the VRP is set to NaN (Not a Number).
- **[VolcanoName_MIROVA_Database_v1.csv](#)**: Single volcano version of the database containing the list of all nighttime thermal anomalies detected by MIROVA from March 1, 2000 to December 31, 2019. Each thermal detection is accompanied by a list of associated parameters as reported in Table 1.

Table 1. List of parameters distributed for each volcano in the file “VolcanoName_MIROVA_Database_v1.csv”.

parameter	unit	definition
UTC	<i>dd/mm/yyyy</i> <i>hh:mm:ss</i>	Date and time of the satellite acquisition (all times are UTC);
Dayflag	<i>adim</i>	Daytime flag: 0 = nighttime; 1 = daytime;
Sensor	<i>adim</i>	Sensor flag: 1 = MODIS/Terra; 2 = MODIS/Aqua; 3 =VIIRS/Suomi NPP; 4 = VIIRS/NOAA-20;
Resolution	<i>m</i>	Nominal spatial resolution of the sensor (pixel size)
SatZen	<i>degrees</i>	satellite zenith: the angle between the direction of the satellite and the local zenith. (satzen=0°: satellite is at nadir);
SatAzi	<i>degrees</i>	satellite azimuth, the angle from the North (north clockwise-positive from 0° to 360°)
Npix	<i>adim</i>	number of alerted pixel
Tot_Lmir_hot	$W m^{-2} sr^{-1} \mu m^{-1}$	Sum of MIR radiance from all alerted pixels
Tot_Lmir_bk	$W m^{-2} sr^{-1} \mu m^{-1}$	Sum of MIR background radiance from all alerted pixels
VRP	<i>Watt</i>	Volcanic Radiative Power calculated using MIR method
Lat	<i>degrees</i>	Latitude of the hottest alerted pixel
Lon	<i>degrees</i>	Longitude of the hottest alerted pixel
max Dist	<i>m</i>	Distance of the alerted pixel furthest from the volcano summit

Reference for SIO₂ content (included in Global_Annual_VRE_v1.xls)

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