



## **Validation of the LMDZ-INCA climate chemistry model**

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LMDZ-INCA is a coupled Climate-Chemistry Model developed to study the interactions between dynamical, physical and chemical processes in the troposphere and stratosphere and in particular the upper troposphere and lower stratosphere. The model uses 50 vertical levels from the surface to 76 km and a horizontal resolution of  $2.5^\circ$  in latitude and  $3.75^\circ$  in longitude. 63 chemical species are treated with this model.

Our first reference simulation was to reproduce the 1980-2006 period (REF2 CCM-Val simulation). This simulation is designed to reproduce the well-observed period of the last 25 years during which ozone depletion is well recorded, and allows for a more detailed investigation of the role of natural variability and other atmospheric changes important for ozone balance and trends. This transient simulation includes all anthropogenic and natural forcings based on changes in trace gases, volcanic eruptions, and sea surface temperatures (SSTs). SSTs in this run are based on observations.

In this study, we evaluate LMDZ-INCA by making comparisons with satellites and ground-based measurements. We use the UARS observations provided by the CLAES (1991-1993), HALOE, and MLS (1991-2005) instruments. To complete the 2000's period, we use the Odin SMR and OSIRIS (2001-2006) measurements. We also compare the LMDZ-INCA ozone field with the TOMS observations. The NDACC network observations give us the opportunity to make comparisons up to the stratosphere through lidar and micro-wave profiles. Finally we use the HIBISCUS campaign to improve our understanding of the H<sub>2</sub>O stratospheric concentration.

The reference simulation is performed within the European project SCOUT O3 Activity 1 (Ozone, climate and UV predictions). This reference simulation is also carried out in the framework of the ongoing CCMval activity established within the SPARC project.