**Context and scientific objectives**

The characterization of Volatile Organic Compounds (VOCs) is fundamental to understand chemical processes and health and climate impacts. These compounds are emitted by both biogenic and anthropogenic sources [Kesselmeier and Staudt, 1999; Borbon et al., 2013]. They play a large role in atmospheric chemistry, including the formation of ozone and Secondary Organic Aerosol (SOA). SOA are potential precursors of clouds and are not well estimated in models [Seinfeld and Pandis, 2016]. A better understanding of the chemical processes of VOCs will improve the quality of chemical modeling and prediction. It is one of the objectives of BIO-MAIDO* intensive field campaign.

BIO-MAIDO aims:
- Characterize the atmospheric dynamic and chemical processes: VOCs emissions and SOA formation
- Modeling chemistry, dynamics and cloud formation along the slope of Maïdo observatory.

*Bio-physicochemistry of tropical clouds at Maïdo

**Sampling sites and instrumentation**

A large instrumental panel was set up during one month in Réunion island. Two sites have been targeted (FIG.1):
- Petite France (PF) at 950 m near rural and urban emissions, measurements have been performed in a mobile lab.
- The Maïdo observatory (MO) at 2200 m which is a background measurement site [Baray et al., 2013].

DAY: air masses come from the N-W and pass above PF then MO.

NIGHT: PF is at the limit of the mixed boundary layer and MO in the free troposphere.

At all sites, meteorological conditions and reactive gases concentrations (including ozone, NOx) have been recorded. VOC measurements were performed by PTR-MS from March 1st to April 4th, 2019. The period from April 1st to 3rd was selected to study chemical and dynamical processes at small scale.

This period is during the wet and hot Austral summer season.
Diurnal variations from April 1st to 3rd, 2019 observed from upslope and downslope sites of this campaign are presented in FIG.3. The differences in concentrations show the influence of chemical reactions during transport from PF to the MO.

- High concentrations of isoprene during the day \(\rightarrow\) local biogenic emissions at the MO
- Concentration of monoterpenes at the MO advected from PF
- High oxidation of isoprene in PF (concentration of MACR+MVK is doubled)
- Traffic influence in PF at 7 a.m., 10 a.m. and 6 p.m. with high emissions of benzene

\(\rightarrow\) More oxidation processes at the MO than PF.

**VOCs observations**

Diurnal variations from April 1st to 3rd, 2019 observed from upslope and downslope sites of this campaign are presented in FIG.3. The differences in concentrations show the influence of chemical reactions during transport from PF to the MO.

- High concentrations of isoprene during the day \(\rightarrow\) local biogenic emissions at the MO
- Concentration of monoterpenes at the MO advected from PF
- High oxidation of isoprene in PF (concentration of MACR+MVK is doubled)
- Traffic influence in PF at 7 a.m., 10 a.m. and 6 p.m. with high emissions of benzene

\(\rightarrow\) More oxidation processes at the MO than PF.

**Conclusion and future work**

- Use of a chemical modeling tool (CLEPS) is needed.
- Coupling dynamical atmospheric air masses with chemical analysis is necessary to understand atmospheric processes.

Two coupled models (Meso-NH and CAT) are going to be used for dynamical atmospheric transport study of air masses. An example of backward trajectories is presented in FIG.4.

**Acknowledgements:** This research received funding from the ANR-BIOMAIDO (ANR 18 CE01-0013-01)