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CENTRE NATIONAL
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JC2
JOURNÉES CNES JEUNES CHERCHEURS

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CITÉ DE L'ESPACE

Doctorant

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MICROCARB: THREE-DIMENSIONAL MODELING OF THE $O_2(^1\Delta)$ DAYGLOW AND IMPLICATIONS FOR OZONE IN THE MIDDLE ATMOSPHERE

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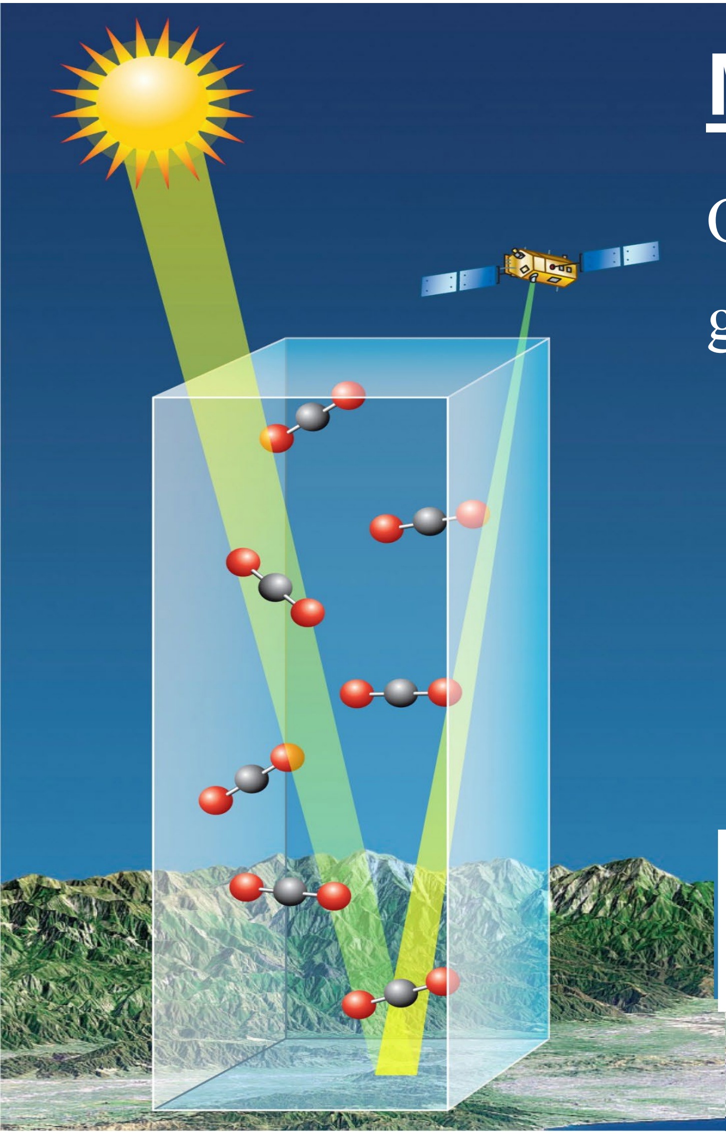
LABORATORY : LATMOS

Context



MicroCarb *(launch planned for 2025)*

Objective: to map, on a global scale, the sources and sinks of the greenhouse gas CO_2.

$$r_{CO_2} = \frac{CO_2\ column}{O_2\ column\ /0{,}21}$$

Up to now, the way of measuring the O_2 column by satellite can induce significant errors in the CO_2 concentration

MicroCarb innovation: Addition of a new way of measuring the O_2 column to obtain more accurate CO_2 measurements.

Objective/ Methods

Unfortunately, this new method is hindered / contaminated, by an emission called $O_2(^1\Delta)$ DAYGLOW

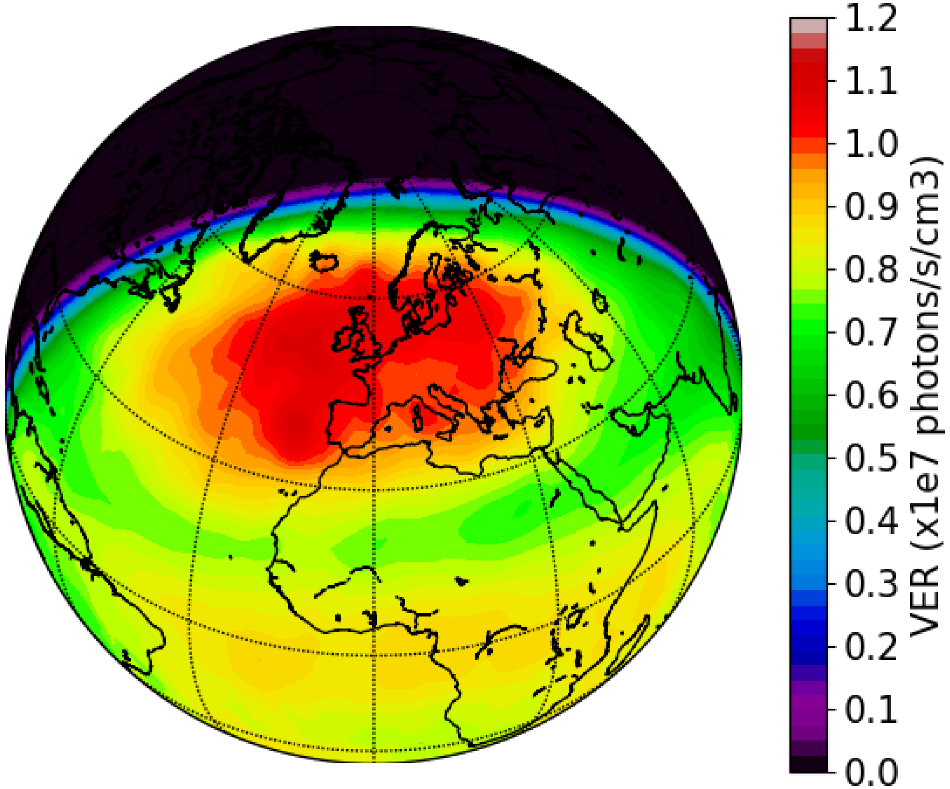
Our objective is to improve the quantitative understanding and the knowledge of the $O_2(^1\Delta)$ dayglow to eliminated it in MicroCarb observations.

We have developed a model of this DAYGLOW in an advanced chemical – transport model: REPROBUS

REPROBUS will provide priori quantitative information on the $O_2(^1\Delta)$ dayglow for MicroCarb mission in order to eliminate this contamination in the observations.

REPROBUS

$O_2(\Delta)$ dayglow VER at 0.9 hPa



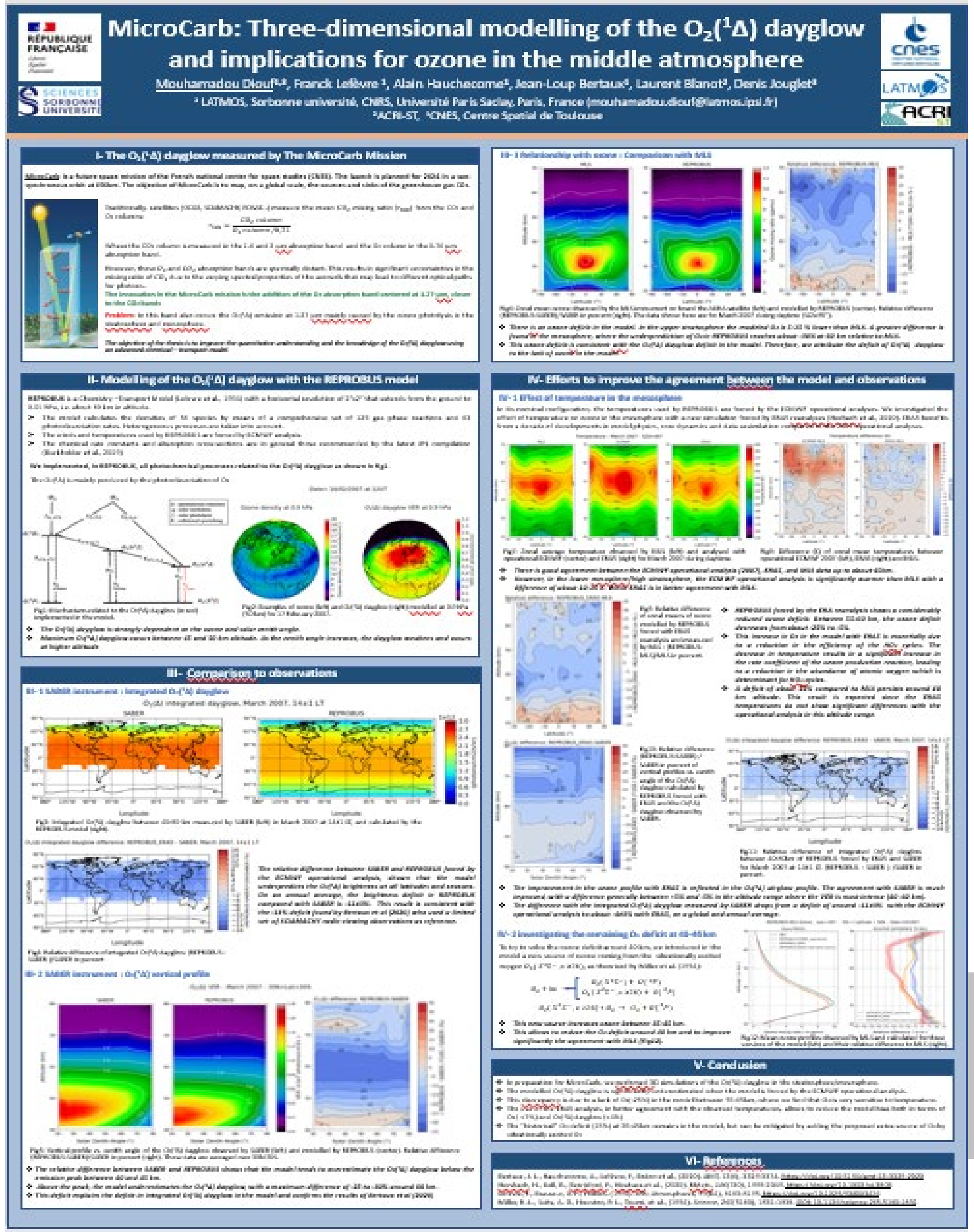
Results

We evaluated our develloped model in comparison to satellite observations

- REPROBUS presents an **dayglow deficit** compared to observations

- We found that this deficit is due to an **ozone deficit** which is historical in transport chemistry models

We managed to resolve this historical ozone deficit and consequently the dayglow deficit, thanks to temperature



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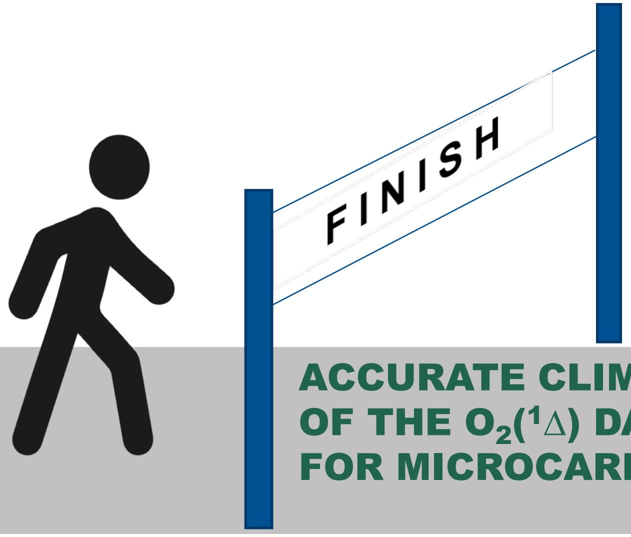

ACCURATE CLIMATOLOGY OF THE $O_2(^1\Delta)$ DAYGLOW FOR MICROCARB MISSION