New isotopic tracers of the chemistry-climate relationship (ISOTRACE, FP21)

From a theoretical point of view, climates and chemical states of the Earth's atmosphere should evolve jointly, one influencing the other. But as of today, this complex relationship is largely unexplored. The major obstacle to explore and establish such a relation is that paleo-reconstructions of the chemical state of the atmosphere are extremely difficult to establish, simply because so far we have not studied a set of tracers with the required quality. The aim of this project is to make such tracers available through analytical developments. The project proposed here has the main goal of developing new tools to determine past changes in the chemical state of the atmosphere (oxidative capacity) and to provide the first elements from which reconstruction of this very important relationship between climate and chemistry can be derived from natural archives. The central player in our strategy is the oxygen isotopic composition of atmospheric trace compounds, including the rarely measured abundance of the 17O isotope. The oxygen isotopic compositions will be used to trace in time some of the most important oxidation reactions occurring in the atmosphere.

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