2 HYDROCARBON COMBUSTION. HYPOTHESIS ON THE ORIGIN OF WATER ON EARTH. ISOTOPIC ANALYSIS.

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ABSTRACT.

The detection of hydrocarbons in the interstellar medium and young circumstellar disks by large infrared telescopes, opens up a new range of unexplored possibilities. In this presentation, the combustion of hydrocarbons is proposed as contributing to the origin of terrestrial water, as a byproduct of accretion. Water produced by combusting current hydrocarbons has $\delta^{18}O$= + 13.4‰ and δD= – 82.8‰ SMOW. It can be assumed that the original water δD should have a similar negative value. Another argument is that on Earth, the oxide minerals, as well as seawater and atmospheric oxygen follow the mass dependent terrestrial fractionation line on oxygen $\delta^{17}O = 0.52 * \delta^{18}O$. This indicates a single original oxygen reservoir, pointing to an endogenous and homogeneous formation process. The isotopic difference could be accounted for by the Dole effect $\delta^{18}O$= + 23.88 ‰, caused by the isotopic fractionation of biological respiration. In the first part of the presentation I will explain the process that could have occurred if the Earth had been surrounded by hydrocarbons during primary accretion. In the second part I will analyze the different hydrogen and oxygen isotopes to test the feasibility of the hypothesis. I also note that Titan, one of Saturn's moons, has abundant hydrocarbons. Titan could be the only planetary body that did not suffer major impacts during the formation of the Solar System, thereby preserving the original hydrocarbon composition of the protoplanetary disc.