



ID de Contribution: 17

Type: **Oral presentation**

Unveiling the prebiotic chemistry of ocean worlds; laboratory and in situ investigations

mercredi 28 février 2024 16:45 (15 minutes)

In the coming years, space probes will be sent to the surface of ocean worlds of the solar system such as Titan, Europa and Enceladus to characterize their habitability and search for traces of life. In particular, the Dragonfly mission which was confirmed in June 2019 is expected to launch in 2028 and to land on Titan in 2034.

My thesis is intended to contribute to three main objectives in this context.

Firstly, I will take part in the development of the gas chromatograph that will be included on Dragonfly. This instrument includes injection traps which are meant to focus the sample's components before releasing them all at once into the chromatographic column where they will be separated. I will select the chemical adsorbents to be used in those traps and optimize the focusing and releasing conditions to ensure the best possible efficiency within the mission constraints.

Secondly, I will investigate in situ sample preparation methods. For example, the salts present on the surface of Europa and Enceladus may cause analytical interferences with the organic matter we are looking for, as well as damage to the instruments. Thus, it is essential to remove those salts from the samples before analyzing them. To this end, I will develop a desalting process to be used on the missions to these two worlds.

Finally, in order to facilitate the interpretation of future in situ data, I will characterize samples which are known to be analogous to the surface of those ocean worlds. Synthetic analogues to Titan aerosols –called tholins –can be obtained from the PAMPRE experiment, which simulates the atmospheric composition and conditions of this moon. In the case of Europa and Enceladus, natural analogues can be collected from terrestrial hyper-saline environments.

Astrophysics Field

Planetology (including small bodies and exoplanets)

Day constraints

I will not be available to present on the Thursday morning (February 29th). I will be available the rest of the time.

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Classification de Session: Session 4