

SCCO-SJ10: the UPPA in orbit!



The Laboratory of Complex Fluids and their Reservoirs (LFCR) took part in a Chinese space mission designed to measure, in microgravity conditions, the thermo diffusion of multi-component petroleum fluids.

On April 5, 2016, at 5:38 p.m., the Chinese satellite ShiJian-10 carried by a Long March 2D orbital carrier rocket took off from the Jiuquan base in Inner Mongolia, at the heart of the Gobi desert. It was carrying several hundred kilos of equipment in order to perform 20 or so scientific experiments in orbit around the Earth over a period of 12 days.

Guillaume Galliero, Director of the Laboratory of Complex Fluids and their Reservoirs (LFCR), along with his colleagues of UPPA, savored the successful launch of the rocket, which had on board six cells to measure the thermo diffusion of petroleum fluids under high pressure defined by them.

Satisfaction was twofold: *“For the first time ever, an experimental system developed in Europe was embedded on a Chinese satellite, and at the same time, the event marked the completion of a research project of more than 10 years carried out and coordinated from Pau, in cooperation with the European and Chinese space agencies, European laboratories, Chinese researchers and the two industrialists, TOTAL and Petrochina.”*

Practically speaking, the objective of the SCCO-SJ10 (Soret Coefficient in Crude Oils in SJ10 satellite) project was to measure, in space, the thermo diffusion of multi-component petroleum fluids at pressures of up to 400 bars and at an average temperature of 50°C.

Based on this information, we could improve our predictions of the distribution of species in a reservoir in initial conditions in order to optimize production. Why in space? Simply because thermo diffusion is difficult to measure on Earth due to gravity.

Experimentally speaking, the pre- and post-flight procedures were conducted in one of Petrochina’s laboratories in Beijing (RIPED) where one of the teams of the LFCR was sent to prepare and perform chromatographic analyses on the mixtures contained in each part of the cells, in cooperation with local researchers.

Out of the six experiments initially planned, two were successfully completed. A satisfactory ratio where space missions are concerned, as the risk of failure is high. Part of the results obtained during this unprecedented experiment were [published in August 2017 in the prestigious review *Nature Microgravity*](#). Recognition of our status as high flyers!

 guillaume.galliero@univ-pau.fr