

## 研究課題名

利用者氏名(所属機関)

利用カテゴリ XT4S ・XT4A ・XT4B ・XT4C ・XT4MD ・SX9A ・SX9B ・SX9MD ・  
GRAPE-A ・GRAPE-B ・GRAPE-C ・汎用PC

成果の概要を記入してください。必要に応じてページを加えても構いませんが、pdf のファイルサイズの上限は2MB とします。

Write up your research report in this area. Total file size should be less than 2 MB in PDF format.

Our project entitled “The curious case of Mars formation” aim at solving the puzzles of forming Mars with different isotopic composition with Earth (Brasser et al. 2017) by combining the  $N$ -body simulation results and cosmochemistry data. We tested the Classical model (without giant planets migration) and the Grand Tack model (include giant planets migration).

Our team ran 48 new simulations on the CFCA’s cluster, each took around 6 months.

However, we discovered that the growth of Jupiter is slower than what we expected and hence we decide not to include the simulation results into our latest submitted paper.

The main results of our work are as follows:

1. The accretion zone of Earth and Mars analogues tend to overlap with each other, pointing to the fact that both model tend to form Earth and Mars with similar isotopic composition (Fig. 1)
2. Classical model fares better in producing Mars’ documented composition (>60%) than Grand Tack (~20%) (Fig 2)

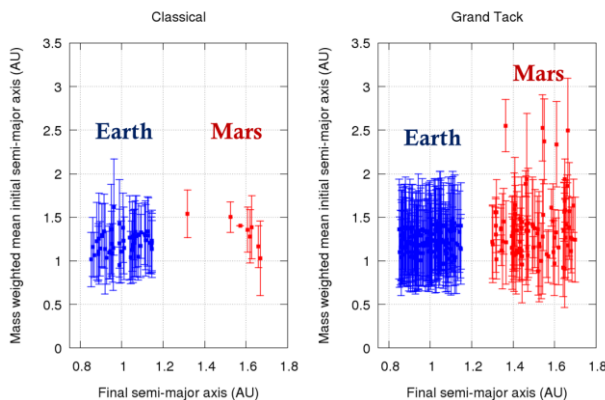


Fig. 1- Accretion zone of Earth and Mars

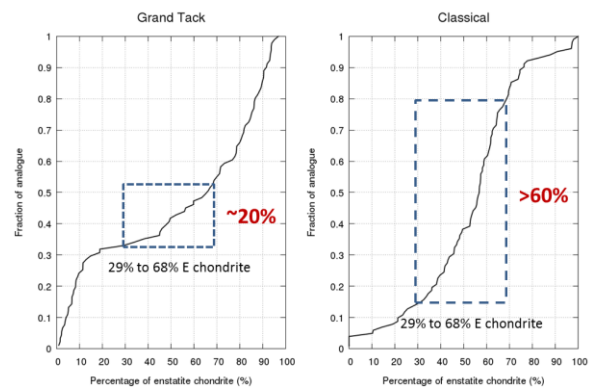


Fig. 2- CDF of the Mars analogues’ final composition

Paper published that have used the CFCA's cluster

**J. M. Y. Woo**, R. Brasser, S. Matsumura, S. J. Mojzsis, S. Ida, 2018, The curious case of Mars formation, A&A, submitted