Geophysical Research Abstracts,
Vol. 10, EGU2008-A-12392, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-12392
EGU General Assembly 2008


# Marco Polo: Near-Earth Object Sample Return Mission

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MARCO POLO is a joint European-Japanese sample return mission to a Near-Earth Object, selected by ESA in the framework of COSMIC VISION for an assessment study. This Euro-Asian mission will go to a primitive Near-Earth Object (NEO), which we anticipate will contain primitive materials without any known meteorite analogue, scientifically characterize it at multiple scales, and bring samples back to Earth for detailed scientific investigation.

Marco Polo is based on a launch with a Soyuz launcher and consists of a Mother Spacecraft (MSC), possibly carrying a lander. The MSC would approach the target asteroid and spend a few months characterizing the target object. Then, the MSC would descend to retrieve several samples, which will be transferred to a Sample Return Capsule (SRC). The MSC would return to Earth and release the SRC into the atmosphere. The SRC would enter the Earth's atmosphere and be recovered on ground to make the sample of the NEO available to ground-based laboratories.

NEOs are part of the small body population in the solar system, which are leftover building blocks of the solar system formation process. They offer important clues to the chemical mixture from which planets formed about 4.6 billion years ago. Studying

samples from a Near-Earth Object will be an excellent opportunity to study the formation and the evolution of the Solar System, and their potential contribution to the formation of Life.

We will present the current status of the mission study and the scientific objectives which will be addressed by the mission.