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Flower elliptical-orbit constellation exploiting millimetre-wave radiometry and radio occultation for meteo-climatological applications

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Abstract. This paper reports on the potential of combining elliptical-orbit Flower constellations with millimeter-wave radiometry and radio-occultation, a mission concept briefly named FloRad2. The advantages of flower constellation with respect to conventional orbits are discussed, including the flexibility ensuring increasing coverage with separate launches. Millimeter-wave radiometry and radio-occultation receivers provide the advantage to design fairly compact payloads that comply well with current technology of mini-satellites. Millimeter-wave radiometry and radio-occultation techniques are somewhat complementary and an optimal combination of these observations results in atmospheric products with enhanced vertical and horizontal resolutions. Thus, the combination of small, light payloads employing millimeter-wave radiometry and radio-occultation with Flower elliptical-orbit constellations may result in an optimal compromise between retrieval performances and system complexity that is ideal for continued long-term missions with meteorological and climatological applications.

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