Consiglio Nazionale delle Ricerche

CNR-Istituto di **Elettronica** e di **Ingegneria** dell'**Informazione** e delle **Telecomunicazioni**

Thursday seminars

Taking a Look at the Future: a cocktail hour event!

Consiglio Nazionale delle Ricerche

ISAC

Dr. Sante Laviola

(CNR-ISAC)

Microwave satellite sensors for detecting heavy precipitation. Looking at near future with new generation radiometers

The detection and tracking of heavy precipitation from space is one of the key topics of the satellite remote sensing. Heavy precipitation generally forms inside deep convective clouds, a type of "tower cloud" reaching the top of the atmosphere (around 10-12 km) where the melting of frozen hydrometeors (graupels and hail) enhances the amount of waterfall at ground. The main difficulty of satellite remote sensing is offering a robust detection model of ice clouds imbedded into the large-scale storms responsible of local flash floods or intense hailstorms. During the last two decades the improvement of microwave technology on board to the sun-synchronous satellites allowed to increase the performances of methods and algorithms for the detection of precipitation from space.

In this seminar organized for the series "Incontri del giovedì" at CNR-IEIIT, overflying on the fundamentals of microwave radiative transfer, a new microwave-based satellite method to detect deep convections and hailstorms will be presented. The probability-based MicroWave Cloud Classification-Hail (MWCC-H) method developed by Laviola et al. (2020a-b) is designed for the frequency range 150-170 GHz of microwave radiometers orbiting with the Global Precipitation Measurements Constellation (GPM-C). The application of the MWCC-H computational scheme to the whole GPM-C demonstrates the high potential of method to map the evolution of hail-bearing systems at very high temporal rate. The performances of MWCC-H are also exploited to produce a coherent and homogeneous dataset for studying the climatology of severe convective storms at global scale.

Ongoing experiments are currently simulating the application of the MWCC-H to the new generation microwave sensors (MWS, MWI) developed in the EUMETSAT Polar System-Second Generation (EPS-SG) programme. These studies fit the main scientific requirements of further satellite missions where low-orbit constellations of nano-satellites are used to recursively monitor at very high-spacetime resolution the evolution stages of short-life cycle convective systems.

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Registration form

Teams Webinar • 9 February 2023 – 17:30