Design for green, disposable, mini radiosondes to track fluctuations along isopycnic surfaces in cloud environments

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Design for green, disposable, mini radiosondes to track fluctuations along isopycnic surfaces in cloud environments TESSA CHIARA BASSO, Politecnico di Torino, DISAT , MICHELE IOVIENO, Politecnico di Torino, DIMEAS, SILVANO BERTOLDO, Politecnico di Torino, DET, GIOVANNI PEROTTO, ATHANASSIA ATHANASSIOU, Istituto Italiano di Tecnologia, Smart Materials, FLAVIO CANAVERO, Politecnico di Torino, DET, GIOVANNI PERONA, Envinsens Technologies s.r.l., DANIELA TORDELLA, Politecnico di Torino, DISAT
— An introduction to innovative, bio-compatible, ultralight, disposable radiosondes that are aimed to be passively transported on isopycnic surfaces in cloud and clear air environments. Their goal is to track small-scale fluctuations of velocity, temperature, humidity, acceleration and pressure for several hours within and outside the cloud boundary. With a target weight of 15 g, the volume is chosen such that the probes float on isopycnic surfaces at constant altitudes from 1000 to 3000 m. They are filled with helium gas to obtain a buoyancy force equal to the weight of the system. Transmitters within the probes will send data to receivers on Earth to be analysed and compared with numerical simulations. To minimise their environmental impact, it is foreseen that the disposable radiosondes be made with biodegradable smart materials which keep the desired hydrophobicity and flexibility. These environmentally friendly, hydrophobic balloons will provide an insight into the unsteady life cycle of warm clouds over land, ocean and alpine environments. These explorative observations will contribute to the current understanding of microphysical processes in clouds with the purpose of improving weather prediction and climate modelling.

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