

Résumé du sujet en anglais

Appliance of the electromagnetic probe for the in situ density measurement

The study of marine sedimentary systems and assessment of geological hazards associated with different external mechanisms (earthquake, tsunami ...) require a characterization of the physical and mechanical properties of the medium (such as conductivity and density of the sediment). This can be achieved in laboratories on sediment samples obtained by coring, often with significant disturbances. In situ measurements can overcome this problem. These measurements require a vector able of sinking and placing the sensor into a defined depth below the sea bottom. Few types of equipment are able to accomplish these measurements with such a constraint. In IFREMER, only one instrument can be deployed and operated to perform these measurements, PENFELD penetrometer. The penetrometer, in its design, was equipped with sensors from the existing equipment technology. These sensors offer several disadvantages: an acquisition that can't be achieved in real time and the fact that they do not allow the simultaneous knowledge of all the parameters essential for various applications. The aims of these studies concern the feasibility and implementation of a new electromagnetic sensor used for calculating the volume density of the medium and provides a size appropriate to the tip of the penetrometer in order to use in a deeply aquatic environment. The solution should allow the bearing to the aforesaid disadvantages.

Keywords: mass density, conductivity, sensors, microwave devices, wave-matter interaction, immersed antenna.