

Estimation of Methane From Kerala-Konkan Onshore Peatlands of West Coast India by Ground Penetrating Radar Method

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ABSTRACT

Peatlands are significant in generation of methane can be a clean energy resource in future. Quaternary peatlands of West coast of India have abundant peat deposits, have less studied by researchers. We have utilized non-invasive Ground Penetrating Radar Method (GPR) to investigate peatland studies along with the direct measurement emission rate. This technique has not been used to explore the distribution and release of biogenic gas in Indian Peatlands. So, the present research aims to identify the presence and saturation of biogenic methane in humid tropical peatland of Kerala-Konkan coastal inlands of West Coast of India. We have conducted field scale survey with GSSI GPR system, using 100 and 200 MHz frequencies shielded antennas and direct core sample collection for lab experiments. The presence of shadow zone and variations in EM velocity and amplitude of radar signals were analysed to identify the thickness and geometry of the peat from the common offset radargram. Semblance analysis from the Common Midpoint (CMP) data used to estimate the two-way travel time of reflections from each layer and from the petro physical model we have calculated gas percentage at respective depths. The compositional analysis by GC-MS results 92% of methane, 0.5% of CO₂ and 7.5% of N₂ within the collected gas indicates its biogenic nature. Peat/carbonaceous clay act as both source rock as well as reservoir rock. The gas is considered to be present in the state of free gas in the porous medium (within the peat matrix) and also as adsorbed gas onto the surfaces of the peat matrix. Our results show the vertical and spatial variations in biogenic methane content in shallow portions (<22m) of stratigraphic column where the peat has sandwiched between confining clay layers. The results are relevant in the current scenario of unconventional energy resources exploration from a new sedimentary setting.