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CHALLENGES AND OPPORTUNITIES FOR EDDY-FLUX MEASUREMENTS OF CO₂ EMISSIONS OF OIL PALM ON PEAT

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This paper reports on the opportunities and challenges of measuring the total net ecosystem exchange from managed tropical oil palm plantations in Southeast Asia. In contrast with other methods used to link CO₂ emissions to point measurements, be they of either water table level or of temporal and spatial grab sampling measurements, the eddy-flux method offers a method which provides *in situ* and continuously a spatial and temporal integration of the net ecosystem exchange at the plantation scale. This confers it the enormous advantage of providing net ecosystem exchange accounting for carbon uptake and respiration simultaneously. The method however must be used with care and a fundamental knowledge of micrometeorology for these measurements to be robust. Some of the challenges involved in day-to-day site selection planning and data analysis interpretation involves the limitation of often small oil palm plantations. Small blocks surrounded by spatial heterogeneities in adjoining land surfaces, whether they arise from tropical forested lands, oil palm plantations of different ages or recent clearings, lead to high surface albedo contrasts. This paper uses lessons learned from experience garnered from other flux measurements in other ecosystems. It also highlights some of the basic uncompromising physical principles to make robust, scientifically credible flux measurements. This paper also addresses how such violations of the principles of eddy-covariance assumptions cannot be easily remedied or corrected without a costly relocation of flux towers. This paper proposes guidelines to ensure that measurements of net ecosystem exchange from realistic operational oil palm plantations are robust.

Keywords:-