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**THE EXPORT OF OLD DOC FUELS EFFLUX OF OLD CARBON DIOXIDE FROM DISTURBED TROPICAL PEAT DRAINAGE SYSTEMS IN MALAYSIA**

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Tropical peatlands constitute ~11% of global peatland area and ~12% of the global peat C pool. Malaysia alone contains 10% of tropical peats. Due to rising global demands for food and biofuels, increasing amounts of drainage, fire, and conversion to plantation have threatened the existence of the Southeast Asian peat swamp forest ecosystem, and changed the greenhouse gas (GHG) emission balance. With this realization, in many areas logged peats have been left to regenerate to minimize these losses. The consequence of this is that unpicking the legacy of multiple land uses on GHG emissions is challenging but required to support land management decisions. Here, we present the results of a field campaign (in July 2013) to a peat swamp forest reserve and a peat-based oil palm plantation in peninsular Malaysia to primarily assess if peat drainage and land use change have resulted in the loss of sequestered carbon to the atmosphere. We found that gas effluxed ranged in age from 500 yr BP at the most disturbed sites, to having a ‘modern age’ at the most pristine site. The <sup>14</sup>C age of the DOM was generally very similar to the effluxed CO<sub>2</sub> and thus old CO<sub>2</sub> flux from organic matter respiration and uv-oxidation of the DOM pool is fuelling old CO<sub>2</sub> efflux. This is the first evidence that old DOM export results in atmospheric CO<sub>2</sub> efflux of old CO<sub>2</sub> and confirms that anthropogenic land use is causing loss of C that has accumulated over millennia: the older, slower carbon cycles are becoming shorter and faster. This finding allows the refinement of C payback calculators in informing land management decisions.

**Keywords:-**