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Long-term production of greenhouse gases from exposed continental shelves and oceanic islands during Quaternary glacial periods

W.W.-S. Yim (1), W.N. Ridley Thomas (1), R.E. Hale (1), A.D. Switzer (1), L. Montaggioni (2), S. Berne (3), and G. Camoin (4)

(1) The University of Hong Kong, Hong Kong SAR, China (wwsyim@hku.hk), (2) University of Provence, Marseille, France, (3) University of Perpignan, Perpignan, France, (4) Cerege, Aix-en-Provence, France

The EPICA Dome C ice core in Antarctica has yielded an 800,000-year record of atmospheric carbon dioxide and methane composition from the Middle Pleistocene climatic transition to the present. In this record, there is a sharp increase in both carbon dioxide and methane immediately following the glacial maxima during the glacial periods which to date remains difficult to explain. We will present evidence to show that the exposed continental shelves and oceanic islands may be at least partially responsible for the production of the carbon dioxide and methane. In exposed siliciclastic-dominated shelves and oceanic islands, acid-sulphate soil development would lead to the release of carbon dioxide while bacterial decay of organic matter would lead to the release of methane. In exposed carbonate-dominated shelves and oceanic islands, karstification would also lead to the release of carbon dioxide. Selected cores from continental shelves and oceanic islands will be used to support such claims. Follow up studies on more cores obtained from other continental shelves and oceanic islands would facilitate the better estimation of carbon dioxide and methane production through comparison between Holocene marine deposits and their pre-Holocene counterparts.