

BIOCHEMICAL EFFECTS OF CYCLONE WINIFRED

M.W. Sandstrom
Australian Institute of Marine Science

The distribution of terrestrial organic material in inner and middle shelf and Reef lagoon sediments off the coast near Innisfail immediately following cyclone Winifred was determined to examine the influence of cyclonic river discharge across the shelf. Capillary gas chromatography of aliphatic hydrocarbons and carbon isotope analysis of bulk organic matter was used to identify terrestrial and marine sources of organic matter in surface sediments. Lagoon sediments from Feather, Gilbey and Potter Reefs were characterized by hydrocarbon distributions indicative of algal sources; terrestrial hydrocarbons were not present above detectable levels. Carbon-13 analysis also indicated an absence of terrestrial higher plant material, with values between 19 and 15 ppt for all reef samples. The abundance of algal hydrocarbons and organic material increased from outer to middle shelf reefs, suggesting there may have been a gradient in productivity across the shelf.

Terrestrial hydrocarbons derived from higher plants were abundant in sediments close to the mouth of the Johnstone River, and decreased to low levels in middle shelf sediments. Carbon-13 analysis also indicated a gradient in terrestrial organic material across the shelf, with values decreasing from 26 ppt near the Johnstone River, to 14 ppt, typical of reef derived organic material, in sediments near the reefs.

Cyclonic river discharge of terrestrial organic material, and presumably other nutrients, seems to have been confined to the inner and middle shelf, despite the fact that river discharge was greater than average daily wet season discharge. Hence the phytoplankton bloom that occurred in middle and outer shelf reefs and inter-reef lagoon waters after the cyclone must have been the result of nutrient input from alternative sources. Resuspension of bottom sediments by cyclonic winds and release of pore water nutrients into the water column is suggested as an important source of nutrients for phytoplankton productivity in the reef waters, rather than river discharge.