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**Abstracts  
Special Contributions  
Topics for Discussion  
Field Itinerary  
Final Report**

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of Lake Michigan. Periods of erosion are caused by high water levels and result in the partial destruction of the complex and the extinction of marsh vegetation by floods and influxes of water-borne sediments. Periods of growth occur during stable or falling water levels and result in the formation of marshes and new sets of beach ridges.

Samples of organic matter, collected from sets of beach ridges formed during single periods of essentially continuous sedimentation, have been dated. The dates indicate that high water levels occurred at 600, 3200, 6400, and 7400 years before present, while relatively low levels occurred at 1100, and 2200 YBP. These lake levels show an inverse correlation with mid-latitude temperatures of northwest Europe derived by pollen analysis. The correlation of high lake levels with low temperatures was apparently due to reduced evaporation. The correlation suggests that much the same climatic conditions existed in northwestern Europe and northeastern United States.

The temperature variations that resulted in palynomorph variations in Europe, however, are not recognized in the pollen zones of the United States. Vegetation zones in the Upper Great Lakes region are very broad and variations in temperature apparently occurred too rapidly for new vegetation patterns to be established.

Thus, lake level fluctuations appear to offer a sensitive measure of climate. With careful analysis of sediment patterns these fluctuations may be a useful tool in the correlation of world-wide temperature variations during the Holocene.

## LANDSLIDES AND THE TECTONIC SETTING IN BRAZIL

VICENTE JOSÉ FULFARO (\*)  
WALDIR LOPES PONÇANO (\*\*)

Mass movements of the landslide and rockfall type are very common at the country oriental zone in the high topography brazilian mountains locally named "serras". Those movements are caused by a series of factors among which are predominant the pluvial regime, thickness of soil zone and structure. They occur normally in an isolated form along stretches of same geological framework and when causing damage to engineering works are generally of a local effect being rapidly solved. However, in certain regions as Caraguatuba, State of São Paulo, and in Serra das Araras, State of Rio de Janeiro, those landslides occur in a high frequency causing serious problems to the areas.

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That high frequency of landslides occurrence in a restricted area is believed to be the result of a residual tectonic tension activation in which the first landslide caused by excess of rain act as a trigger. The geological framework of the Caraguatatuba and Serra das Araras areas show a compartment limited by great E-W structural alignments with a continuous tectonic behaviour from the Tertiary to the Quaternary times. In this general framework a residual seismicity must be present in this area. In the Caraguatatuba area the main zone affected by landslides are areas presenting crossing of structural lines with the diminishing of the phenomena away from these zones.

The thesis supported here is that several areas in the country are subject to the same geological hazard since E-W structural lines, some of which linked to the Middle Atlantic Ridge, can reach the continent. In northeastern Brazil some of these lines caused even volcanic activity in a recent past. A map of the most susceptible zones of high landslide occurrence will help the human occupation and the preservation of engineering works in these areas.

## **SOME GEOMORPHIC CONSEQUENCES OF A FOREST CONVERSION PROGRAM**

MAXWELL GAGE (\*)

Severely intensified erosion in some areas of North Westland, South Island, New Zealand has followed attempts to replace parts of the indigenous mixed rain-forest with exotic conifer forests in steep, hilly terrains of erodible Late Cenozoic sandstone and conglomerate marginal to former Late Pleistocene piedmont glacier systems. Locally intense though not exceptional rainfalls were the immediate triggering cause.

Study of the regional geomorphic history has shown that the moderating influence of an adaptively resilient indigenous flora must have been present continually as normal erosional landforms were evolving in these areas since the Last Interglacial Period, though the vegetative protection was less effective during earlier cold periods. The recently intensified erosion is more severe than that locally induced over the past century by gold-slucing, limited forest clearing, selective logging, roadmaking and earthquakes.

The episode demonstrates the way in which a well-adapted morphogenetic system, of which the vegetation is an integral part,

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