

## PALEOGEOGRAPHY AND THE PERMIAN – TRIASSIC CRISIS

LUIZ EDUARDO MANTOVANI<sup>1</sup>; ELENICE FRITZSON<sup>2</sup>; ERNANI FRANCISCO DA ROSA FILHO<sup>3</sup>; GABRIEL ELIAS MANTOVANI<sup>4</sup>

(1) Universidade Federal do Paraná – Department of Geology; (2) EMBRAPA – Brazilian Agricultural Research Corporation;

(3) Universidade Federal do Paraná – Department of Geology; (4) Universidade Federal do Paraná – Department of Physics

Email: lem@ufpr.br

The mass extinctions that occurred from the Guadalupian-Lopingian to the Induan-Olenekian time interval are object of scientific discussions. The systems analysis of continental paleogeography can explain how the Earth became almost arid and the life in the ocean was limited by nutritional elements and small amounts of dissolved oxygen. First of all, the collision of North America and Europe with the Gondwana closed Paleo-Tethys Sea at the west, blocking the circulation of the easterly surface currents induced by the trade winds. During the Late Permian the center of Paleo-Tethys sea was just over the equatorial zone. The coastal line of north Pangea formed by Europe, Kazakhastania and Siberia was oriented in the NE-SW direction, while the tropical coastal line of Gondwana was in the NW-SE direction. This arrangement configures a large gulf that trapped all the warm easterly currents of the World circulation. A hot equatorial ocean leads to atmospheric convection cells that remain active all of the year. So the formation of Hadley cells with the convective branch over the ocean generated a lot of rain there. Under the subsiding branch of the cell, the air became hot and dry without possibility of rain formation. The major area of continents was under atmospheric subsidence at this time. Aridity was widespread and a lot of the total atmospheric moisture became rain over the Thetis Ocean. A lot of rivers stopped or diminished their flows to the ocean and seas. The contribution of aquifer waters to the oceanic waters also was very limited. As a result, the supply of mineral and nutrients normally carried by continental waters to the ocean shrank. The plankton was affected, the primary production of biomass decreases. The low oxygen production reduced the levels of this gas in air and waters. The restricted vertical circulation imposed by hot water accumulation at sea surface over the westward axis of the "V" shaped, converted the mesopelagic and bathypelagic zones of Thetis Ocean into anoxia. Large volumes of anoxic water may be moved by seasonal or other periodic sea and ocean currents. The arrival of this kind of waters was probably a major cause of marine and coastal extinctions at the time of Permian-Triassic crisis. During the summers, the heated Gondwana and six months after North Pangea, did not drift monsoons like air mass movements. The temperature and moisture of the air over the Thetis was too elevated and so the barometric pressures weren't high enough to allow any monsoon over the warm lands. During the hemispherical winters the air subsidence was increased over the high albedo continental bare lands, and the dry wind flow was offshore over the coastal areas.