O padrão de retrabalhamento crustal é semelhante àquele de áreas adjacentes, onde o pico metamórfico está datado em ~ 2.0 Ga, como também àquele delineado para o Complexo Juiz de Fora. Algumas idades Rb/Sr entre 3.0 e 2.6 Ga (C. Lafaiete, S. Dumont, Barbacena) sugerem ainda uma crosta pré-existente e reforçam o modelo do retrabalhamento no Proterozóico Inferior.

Finalmente, as idades K-Ar confirmam a evolução policíclica da faixa de transição. Biotitas mostram-se completamente rejuvenescidas pela frente brasiliana marginal (500-550 Ma) ao passo que anfibólios com idades híbridas (1350-1640 Ma) são diagnósticos de um parcial rejuvenescimento de rochas mais antigas. — (*03 de dezembro de 1991*).

*Pesquisa realizada com o apoio financeiro da *FINEP, CNPq* e *FAPESP*

*Bolsista de Iniciação Científica

## EARTHQUAKE-INDUCED LIQUEFACTION FEATURES IN THE CORUMBATAÍ FORMATION (PERMIAN, PARANÁ BASIN, BRAZIL) AND THE DYNAMICS OF GONDWANA

CLAUDIO RICCOMINI[1,2]; MARLEI ANTONIO CARRARI CHAMANI[1]; SAMUEL SUSSUMO AGENA[1]; GELSON LUIS FAMBRINI[1]; THOMAS RICH FAIRCHILD[1] AND ARMANDO MÁRCIO COIMBRA[1,2]

Presented by JOSÉ VICENTE VALARELLI

[1]*Instituto de Geociências, Universidade de São Paulo, 01498 São Paulo, SP, Brazil*

[2]*Research fellow of CNPq/Brazil.*

Sand dikes in shallow marine siltstones of the Corumbataí Formation record a liquefaction event during the Late Permian in the Paraná Basin near Santa Luzia and Recreio (Charqueada Municipality, São Paulo, Brazil).

About seventy dikes were studied revealing a distinct preferential NE orientation and an average thickness of 15 cm, locally reaching 40 cm. Drag folds are a common associated feature in the siltstone layers, clearly indicating that injection of sand took place from below.

Irregular tube-shaped structures up to 70 cm in diameter occur locally and probably represent vents of sand volcanoes.

The orientation of the sand dikes indicates a clear NW-SE direction of extension probably related to ground shaking of $m_b$ greater than 6.0 which induced liquefaction. These movements are thought to have been associated with reactivation of older structures, such as the nearby Guaxupé and Jacutinga Shear Zones and the Mogiguaçu-Dourados Lineament, in connection with the first manifestations of Gondwana breakup in the region. This may well have marked the end of the stable shelf stage (Irati Shale) and the beginning of continentalization in the Paraná Basin (Pirambóia and Botucatu Sandstones). — (*03 de dezembro de 1991*).

## GEOCRONOLOGIA E GEOQUÍMICA ISOTÓPICA DE INTRUSÕES DE NATUREZA KIMBERLÍTICA DA BORDA OESTE DO CRATON DO SÃO FRANCISCO

M. A. S. BASEI E D. P. SVISERO

Credenciado por JOSÉ VICENTE VALARELLI

*Instituto de Geociências – Universidade de São Paulo, 01498 São Paulo, SP.*

Estudo geocronológico (método K-Ar) em andamento de nove corpos de natureza kimberlítica permitiu sugerir a idade de 80 ± 10 Ma para a época principal de intrusão desses corpos. A utilização dos métodos Rb-Sr, Sm-Nd e Pb-Pb em cinco intrusões permitiu evidenciar as diferentes características isotópicas entre os possíveis kimberlitos e outras rochas ultrabásicas alcalinas a eles associadas. Para os kimberlitos os valores de εNd distribuem-se entre –3,5 (Indaiá 1), –2,8 (Limeira 1) e –2,1 (Pântano) com valores menos negativos do que os observados nos outros tipos (–3,5; Indaiá 2 e –3,7; Limeira 2). Essas diferenças são ainda mais acentuadas quando observados os valores de εSr de 8,5 ± 0,5 para os kimberlitos de 18,5 ± 0,5 para os tipos associados. Os valores isotópicos de chumbo mantém as diferenças entre esses dois grupos. Adicionalmente, as razões atuais $Nd^{143}/Nd^{144}$ e $Sr^{87}/Sr^{86}$, indicam que as rochas associadas são bem diferentes dos kimberlitos dos Grupos I e II definidos na África do Sul.

Os corpos brasileiros teriam sua origem no manto litosférico subcontinental que ter-se-ia diferenciado da astenosfera ao redor de 730 ± 70 Ma conforme sugerido pelas idades modelo ($T_{DM}$) neodímio obtidas nas rochas

analisadas. Essa diferenciação estaria relacionada aos processos de subducção ocorridos durante o desenvolvimento da faixa Brasília. Apesar das rochas estudadas intrudirem a supra estrutura Araxá-Canastra e outras coberturas brasilianas, é sugerido, baseado na aloctonia neoproterozóica dessas rochas por sobre o Cráton do São Francisco, um contexto de borda de cráton para o ambiente gerador desse magmatismo. — (*03 de dezembro de 1991*).

## THE VERTEBRATE RETINA AS A MODEL FOR THE STUDY OF SELF-ORGANIZATION IN THE CNS. THE EMERGENCE OF SELF-SUSTAINED AND STRUCTURED ("STRANGE ATRACTOR") ACTIVITY BY SYMMETRY BREAKING

VERA MAURA FERNANDES DE LIMA AND
WOLFGANG HANKE
Presented by HISS MARTINS FERREIRA
*Engenharia Biomédica da COPPE, Universidade Federal do Rio de Janeiro, Rio de Janeiro, RJ.*

The synergetics of the "spreading depression" phenomenon (SD) was introduced by Bureš (summarized in Brain and Behaviour, Bureš et als (1988) pp. 88-95). The mathematically predicted physicochemical spiral waves were produced in the retinal SD and in the Martins Ferreira Laboratory, a Belouzov-Zabotinsky system was devised to behave analogously to the retinal SD, including a "circling reaction" entrapped in a film of filter paper, that spread with a velocity of the same order as the SD (in The Brain and Behaviour of the Fowl ed. by Ookawa, T. Jap. Scient. Soc. Press, Tokio, Martins-Ferreira, H. 1983 pp. 317-333).

In this video, we show an experiment in which at the beginning two circular waves arise from two different mechanical stimuli. The velocity of spread is uniform throughout the network. Then, by adding 10 mM $Mg_2SO_4$ Ringer to the supporting media, most of the activity is stopped and the preparation was washed with "standard" Ringer with 1 mM $Mg_2SO_4$. Following this procedure, self-sustained and structured activity arise and we can see a low dimensional "strange attractor" evolve in two dimensions with time. Four trajectories can be seen of a sequence of spirals. In the beginning, the spread was uniform and thus the network excitability was homogeneous, when most of the activity was forced to stop, the network went from a homogeneous sheet to a "patchwork" of states (theoretically there are $2^{n+m}$ possible states $n$ being the number of neurons and $m$ the number of glia cells). This excitability parameter depends on both the neurons and the glial syncitium such that, depending on the conductivity of the gap junctions that couples the glia cells, a local field will spread with the velocity of light to regions distant from the neural population that by discharging in synchrony, elevated the potassium level in the extracellular space. The massive movement of potassium into the glia in the vicinity, creates a big "sink" of current and a drop of potential (the negative shift characteristic of SD), thus, this electrical field is an emergent property of the system arising from the cooperative behaviour between the elements. The field in turn facilitates the spread of the wave. — (*21 de janeiro de 1992*).

## EFFECTS OF THE PHORBOL ESTER TPA IN SKELETAL MUSCLE CELLS IN CULTURE

CLÁUDIA DOS SANTOS MERMELSTEIN,
HOWARD HOLTZER, CARLOS CHAGAS FILHO AND
VIVALDO MOURA NETO
*Laboratório de Farmacologia Molecular, Instituto de Biofísica Carlos Chagas Filho, Universidade Federal do Rio de Janeiro, 21949 Rio de Janeiro, RJ.*

The phorbol ester TPA, a tumor promoter and activator of protein kinase C, reversibly inhibits the differentiation program of skeletal muscle cells in culture. TPA blocks spontaneous contraction in chick myotubes and induces them to retract, forming multinucleated myosacs. Most myofibrillar structures are dismantled within the myosacs in 30-hours. The disassembly of striated myofibrils induced by TPA follows a characteristic temporal and spatial sequence. First the I-Z-I complexes are disrupted and then, hours later, the myosin heavy chain thick filaments. This rearrangement of cytoskeletal proteins forms stress fiber-like structures (SFLSs).

Using immunocytochemistry, followed by conventional and laser confocal optical microscopy, we demonstrated the presence of muscle as well as non-muscle protein isoforms in the SFLSs. Antibodies