



## ESEG-SG: Sesión General Estructura y Evolución Geodinámica

### **Geodynamical analysis of the controlling factors for the break-up of the Farallon plate and the subsequent rebalancing of forces.**

**Valentina Espinoza**<sup>1</sup>, Ingo Stotz<sup>2</sup>, Giampiero Iaffaldano<sup>2</sup>, Andrés Tassara<sup>1</sup>.

(1) Ciencias de la Tierra, Ciencias Químicas, Universidad de Concepción

(2) Department of Geosciences and Natural Resource Management, University of Copenhagen, Copenhagen, Denmark

The break-up of the Farallon plate into the Nazca and Cocos plates 25 My ago stands among the prominent plate tectonics events at the global scale, and is particularly relevant to the evolution of the Circum-Pacific region. There is, however, no general consensus on the geodynamic causes of this event. A potential thermo-rheological weakening of the oceanic plate, associated with the Galapagos hotspot, has been traditionally considered a possible controlling factor, although the ca. 45 My mismatch between the beginning of this activity (71 My) and the actual break-up of the Farallon plate suggests that other controls might have been at work. This study aims at evaluating the role that variations in the forces driving and resisting the Farallon plate motion might have had in the plate break-up process. Our analysis will consider forces such as net slab-pull, basal drag, transform-fault friction and subduction resistance. The sudden change of motion of the Cocos plate relative to the Nazca plate soon after the break-up suggests a redistribution of the forces to the North and South of the Farallon plate. We speculate that a combination of divergent forces and a rheological weakening induced by the Galapagos hotspot activity might have caused the West-East trending break-up. By estimating (both analytically and numerically) the forces involved, we seek to determine if the fast and progressive subduction of the northern part of Farallon would have led to a sufficient variation of the net force driving the plate. Furthermore, we aim at evaluating the potential role of a redistribution of the plate-boundary forces on the newly-created Nazca and Cocos plates.