Department of Mathematical Sciences

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Colloquium Series

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Numerical modelling of geodynamic processes around the Ring of Fire

The Ring of Fire, a 24,900 miles long rim located along the Pacific Ocean, hosts more than 90% of Earth's seismic activity and more than 75% of Eart's active volcanoes. The movement of several tectonic plates causes a great abundance of volcanoes and earthquakes. Despite the abundance of data collected over the last decades or so in different study areas along the Ring of Fire, our understanding of the deep (hundreds or thousands of km deep) processes that ultimately cause the occurrence of earthquakes and volcanoes is still limited. However, numerical modeling is currently used to tackle complex geodynamic problems by computational simulations of processes that occur along the Ring of Fire. Numerical modelling is used to assist the study of thermal history of plate tectonics once they enter into the Earth's mantle. Since rocks behave as fluids on geological time scale, flow of rocks as fluids is also simulated using numerical methods. In this talk I will present a series of examples where I employed numerical modeling to unravel different geodynamic processes along the Mexico, South America and Japan margins. I will review the system of equations I employ for solving large-scale geodynamic simulations, and briefly describe the methods I use (i.e. such as finite difference methods or finite element methods) to approximate the solutions of these equations. I will also take the opportunity and present the necessary computational infrastructure and resources (i.e. www.lavis.unam.mx) to tackle such large geodynamic simulations.

For further information, please contact
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