



Ander M. De Lecea

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Marine geochemistry

delecea@ukzn.ac.za



Basque
Country

At present I am involved in two stable-isotope projects. My main project is that of my current post-doctoral position in which I work with sediment cores collected in Maputo Bay in order to investigate the paleoclimatic record of this area (a big knowledge gap for the southern African continent), which in turn will provide greater understanding on how sea level and local vegetation has changed over the last 10 000 years. In the second has a more oceanographic perspective to it and is part of a large multi-disciplinary research work. I will be using stable isotopes as well as C:N ratios to understand organic matter transport by oceanic eddies forming in the south of Madagascar.

CURRENT RESEARCH

Topic

The use of chemical and sedimentological proxies to understand Holocene climate and sea level changes on the east coast of Southern Africa.

Methodology

Stable isotope ($\delta^{13}\text{C}$, $\delta^{15}\text{N}$, $\delta^{18}\text{O}$) techniques will be applied to determine changes in the environmental parameters. Sample resolution of 2 cm intervals will be undertaken. $\delta^{15}\text{N}$ values will help in understanding the extent of human impact in these systems. Vegetation changes through time will be analysed through examining $\delta^{13}\text{C}$ values to assess whether C_3 or C_4 plants (or a mixture) dominated the environment. Variability in terrigenous river supply and the origin of organic carbon can be ascertained using $\delta^{13}\text{C}$ signatures and C:N ratios. Additionally, $\delta^{18}\text{O}$ values will help assess 1) past climate change as well as 2) sea level changes.

Application

To understand sea-level changes, vegetation changes, human impact etc.

UKZN main Publications

De Lecea, A.M., Fennessy, S. and Smit, A.J. (2013). Processes controlling the benthic food-web of a mesotrophic bight (KwaZulu-Natal, South Africa) revealed by stable isotope analysis. *Marine Ecology Progress Series*. **484**: 97 - 114

De Lecea, A.M., Smit, A.J. and Fennessy, S. (2011). The effects of Freeze-Thaw Periods and Drying methods on Isotopic and Elemental Carbon and Nitrogen in Marine Organisms. *Rapid Communications in Mass Spectrometry*. **25**: 1853

De Lecea, A.M., Omarjee, A., Cooper, R. and Smit A.J. (2011). The Effects of Preservation Methods, Dyes and Acidification on the Isotopic Values ($\delta^{15}\text{N}$ and $\delta^{13}\text{C}$) of two Zooplankton Species from the KwaZulu-Natal Bight, South Africa. *Rapid Communications in Mass Spectrometry*. **25**: 3640

Past Researches

1. Marine biogeochemistry,
2. marine ecosystem connectivity,
3. marine processes
4. etc

Future Interests

1. Further develop research skill in stable isotope
2. Marine environmental changes
3. Seismic data interpretation
4. Multidisciplinary work

Extra Interests

Enjoy scuba diving, hiking, travelling...