Nutrient uptake and primary production in the East Antarctic sea-ice zone (SIPEX 2 preliminary results).

ROUKAERTS A[1], CAVAGNA AJ[1] AND DEHAIRS F[1]

[1]*Vrije Universiteit Brussel, Belgium*

Covering approximately 40% of the Southern Ocean's surface during maximum extent in September/October, sea-ice is an important component of Earth's climate system and through a variety of feedback mechanisms acts as an agent and indicator of climate change [Thomas and Dieckmann, 2010]. Sea-ice is also a structuring force in Antarctic marine ecosystems and plays a crucial role in the primary productivity and biogeochemical cycling of the Southern Ocean [Thomas and Dieckmann, 2010]. Ice algae -mainly diatoms- primary production can contribute up to 25% to the overall production of ice-covered waters in the Southern Ocean [Arrigo and Thomas, 2004]. Gaining information about primary production and regime of production in the sea-ice is thus crucial to evaluate the role of such a continent/ocean boundary zone.

As a continuation of SIPEX 1 (2007), the SIPEX 2 expedition (Sept.-Nov.2012; R/V: Aurora Australis) took place in the East Antarctic sector (63–66°S, 115-125°E). The SIPEX purpose is to investigate relationships between the physical sea-ice environment, marine biogeochemistry and the structure of the Southern Ocean ecosystems. In this context, our work is focused on improving the understanding of nutrient cycling and primary production in the seasonal drift ice. Various nutrient uptake rates (HCO_3^-, NO_3^-, NH_4^+ and H_4SiO_4) are measured with in situ incubations. Therefore, we used the isotopic tool either by isotope dilution experiments using stable isotopes (^{13}C, ^{15}N, ^{30}Si-incubations) and natural isotopic signal measurement of nitrate ($\delta^{15}N\text{-}NO_3^-$ and $\delta^{18}O\text{-}NO_3^-$). For nitrate isotopy both sea ice and the underlying water column were sampled. Preliminary results and details of our experimental designs will be developed and discussed.

REFERENCES

Arrigo K.R., Thomas D.N., 2004. Large scale importance of sea ice biology in the Southern Ocean. J. Antarctic Science, 16(4), 471-486

Thomas D.N., Dieckmann G.S. 2010. Sea Ice (2nd edition). Oxford, UK: Wiley-Blackwell.

---

[1] Vrije Universiteit Brussel (VUB), Pleinlaan 2, 1050 Elsene, Belgium.