REVEALING AEROBIC CARBON DIOXIDE PRODUCTION IN LAKE AND WETLAND SEDIMENTS IN THE MARITIME ANTARCTICA (FILDES PENINSULA, KING GEORGE ISLAND)

H. Marotta[1], R. Vieira[1], K.K. Rosa[1,2] and R. Jaña[3]
[1]Sedimentary and Environmental Processes Laboratory – UFF - Brazil
[2]Polar and Climate Center – UFRGS – Brazil
[3]Chilean Antarctic Institute (INACH)

OBJECTIVE

The objective of this work is to assess aerobic CO_2 production rates in lakes and wetlands of the Fildes Peninsula (King George Island, Maritime Antarctica).

METHODS

This study was carried out in 4 lakes and 3 wetlands at a deglaciated area of the King George Island, encompassing 3-5 sediment samples from each ecosystem.

Aerobic CO_2 production in surface sediments (depth < 10 cm) was assessed from incubations during 10-18 hours under relatively constant temperature (2-4^o C) within a coolbox in the field, soon after sampling.

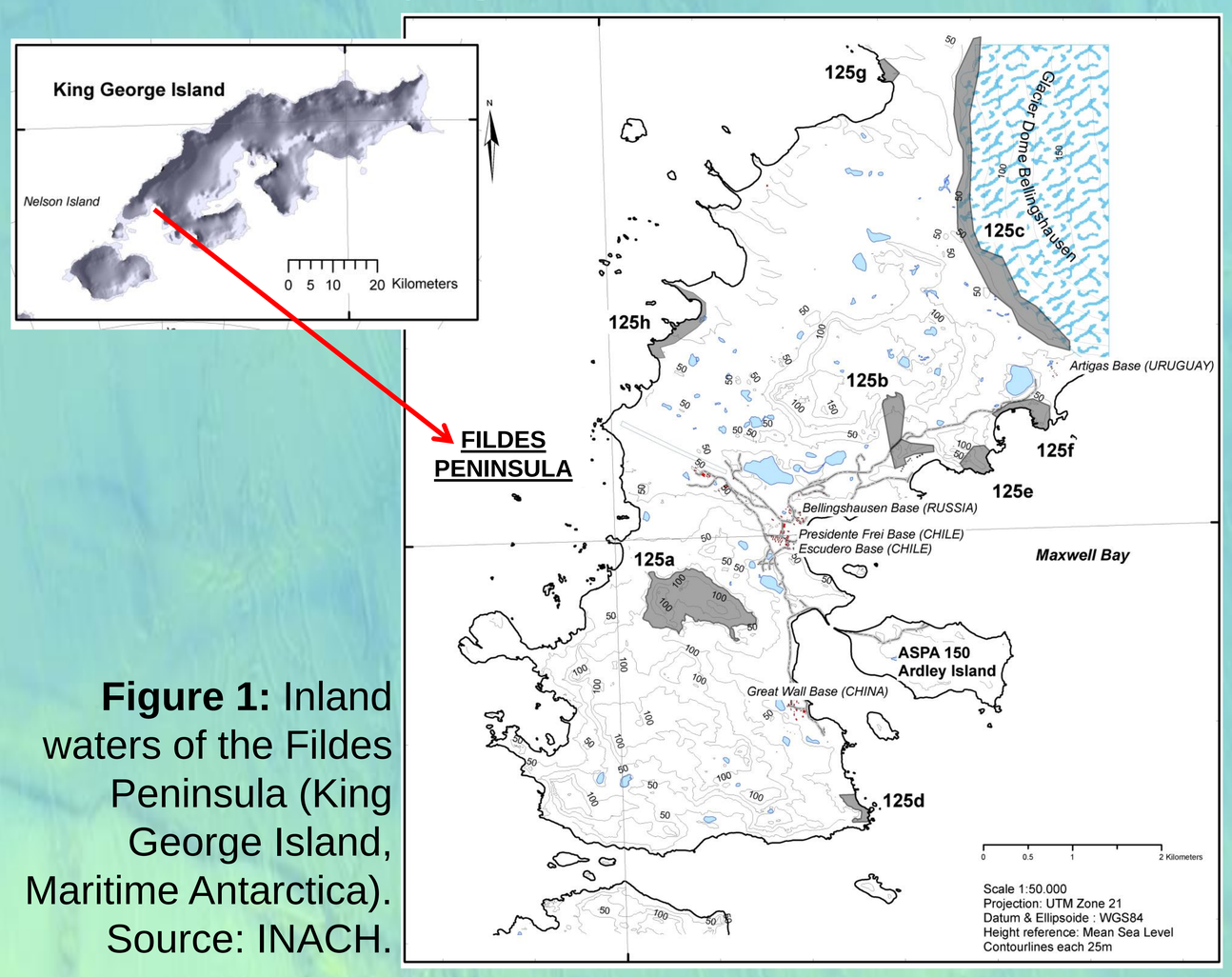

Figure 1: Inland waters of the Fildes Peninsula (King George Island, Maritime Antarctica). Source: INACH.

Figure 2: Types of inland waters studied (panels above) and the sediment incubation system (panel below).

RESULTS

Sediment aerobic CO_2 production by organic decomposition varied widely among ecosystems (Tukey-Kramer, $p<0.05$; Fig. 3A). These rates were, in average, 2.5 times higher in sediments from wetlands than those from lakes, reaching 25.5 and 10.2 mg CO_2 m^{-2} h^{-1} respectively (t-test, $p<0.05$; Fig. 3B).

Also, mean aerobic CO_2 production for both lake and wetland sediments in the subpolar summer were lower, but comparable to these ecosystems at higher latitudes.

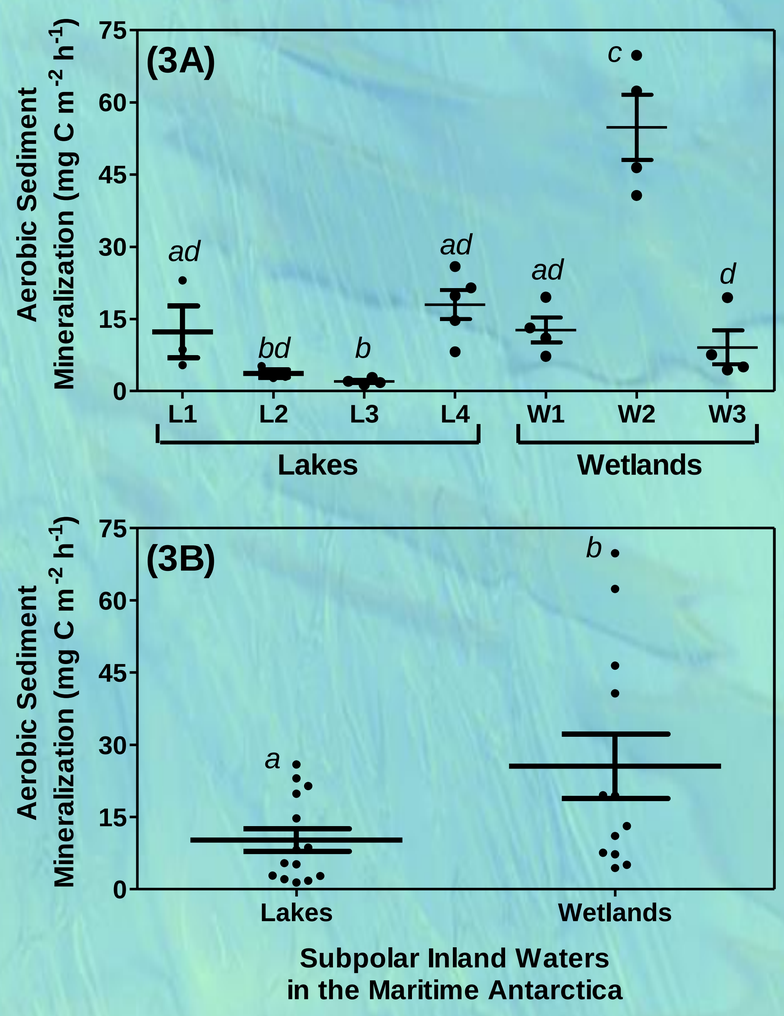

Figure 3: Aerobic CO_2 production in subpolar aquatic sediments of the Maritime Antarctica (Fildes Peninsula, King George Island) comparing data grouped from (3A) each ecosystem and (3B) lake and wetland categories. Each symbol represents one sediment incubation for 4 lakes and 3 wetlands (totalyzing 14 and 12 sediment incubations, respectively). Same letters represent non-significant diferences among ecosystems (Tukey-Kramer, $p>0.05$; panel 3A) and between groups (t-test, $p>0.05$; panel 3B). Horizontal bars indicate means in the center, and respective standard error intervals.

CONCLUSION

➔ Although little studied, extensive wetland ecosystems could be relevant components of the C cycle in deglaciated areas of the Antarctica.

Support: CNPq Conselho Nacional de Desenvolvimento Científico e Tecnológico; FAPERJ 10 Anos; CAPES