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25-29 June 2018 Bordeaux, France



Abstract book

Records of Aeolian activity potentially related with the Little Ice Age in Regressive Coastal Barriers of Southern Brazil

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Key words OSL ages, Cassino, Pinheira.

The Little Ice Age (LIA) was active worldwide from 1300 to 1850. In the last 15 years many papers have indicated the dominance of arid and cold conditions during the LIA in southern South America. In southern Brazil two well-studied regressive barriers (Cassino and Pinheira) are marked by their complex nature, in the sense that they display two or more different dune types or landforms on the surface. Both barriers present many phases of dune formation. While at Cassino the dunes are low relief Transgressive Sand Sheets (Fig. 1A), at Pinheira they are low to medium relief Parabolic Dunes (Fig. 1B). These two barriers have in common historically modern phases of dune formation connected to the modern foredune-beach system. These phases were dated by OSL as active at least from 91 to 345 years ago. Presently these dunes are completely vegetated and stabilized as a result of an historical increase in precipitation and decrease in wind drift potential in the last few decades. The two barriers also present reworked aeolian deposits located landwards and dated at 253 (Cassino) and 365 (Pinheira) years ago. These OSL ages of the dunes of Cassino and Pinheira indicate an aeolian activity on the southern coast of Brazil contemporary to the dry climate of the last pulses of the LIA.

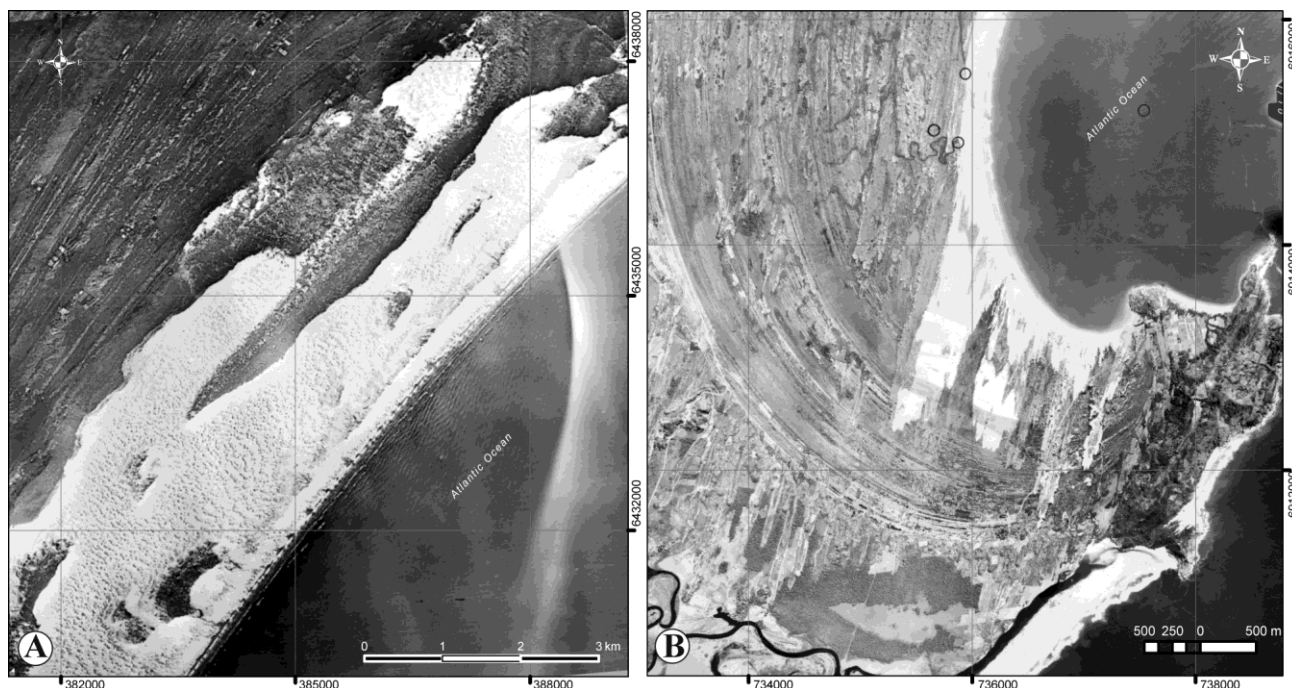


Figure 1. Aerial photos showing active phases of aeolian construction. (A) Transgressive dune sheets at Cassino (1947), and (B) Parabolic dunes at Pinheira (1957).

The Little Ice Age (LIA) is a term originally introduced by Mathes (1939). In general, the climatological literature consider that the LIA (the glacial period of the Holocene) was active worldwide from 1300-1400 A.D. to 1850-1900 A.D. In the last two decades many papers have indicated the dominance of arid and cold conditions during the LIA in southern South America (Tonni et al. 1999, Piovano et al. 2002, Iriondo and Krohling 2007, Guerra et al. 2017). In southern Brazil, two well-studied regressive barriers (Cassino and Pinheira) are marked by their complex nature, in the sense that they display two or more different dune types or landforms on the surface. Both barriers present many phases of dune formation. While at Cassino the dunes are low relief Transgressive Sand Sheets (Fig. 1A), at Pinheira they are low to medium relief Parabolic Dunes (Fig. 1B). These two barriers have in common historically modern phases of dune formation connected to the modern foredune-beach system. These phases were dated by OSL as active at 91 years ago (T-05) and 231 years ago (T-04) at Cassino (Fig. 2), and 220 years ago (P3-1) and 345 years ago (P3-2) at Pinheira (Fig. 3). Presently these dunes are completely vegetated and stabilized as a result of a historical increase in precipitation and decrease in wind drift potential in the last few decades (Fig. 4, Martinho et al. 2010). The Cassino barrier also present reworked aeolian deposits located landwards and dated at 253 years ago. These OSL ages of the dunes of Cassino and Pinheira indicate an aeolian activity on the southern coast of Brazil contemporary to the dry climate of the last pulses of the LIA.

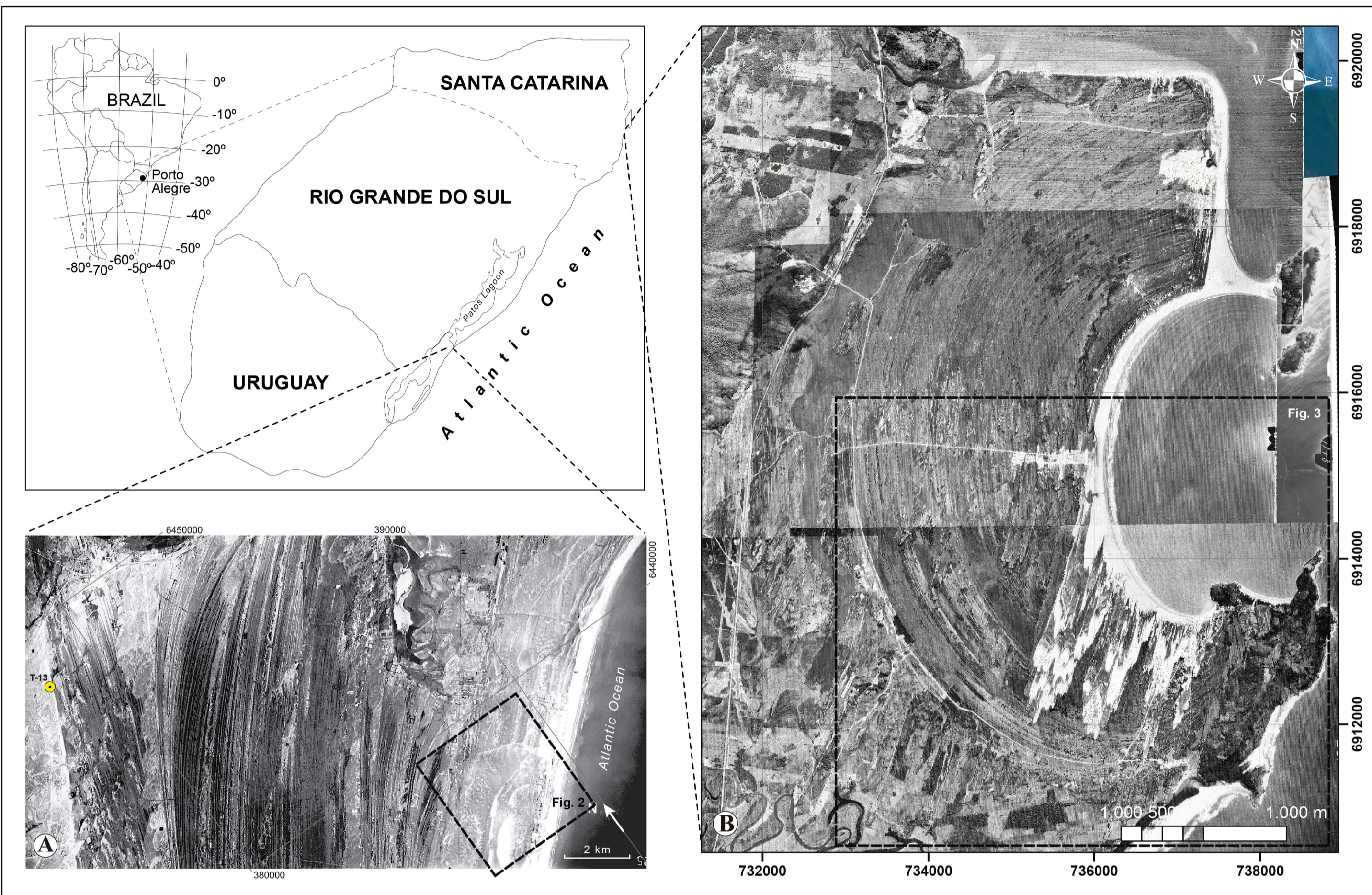


Fig. 1 – Location and general pictures of Cassino Regressive Barrier showing the main phases of transgressive sand sheets (A), and of Pinheira Regressive Barrier showing the main phases of parabolic dunes formation (B).



Fig. 3 - Detail of the relatively modern phase of parabolic dunes formation at Pinheira.

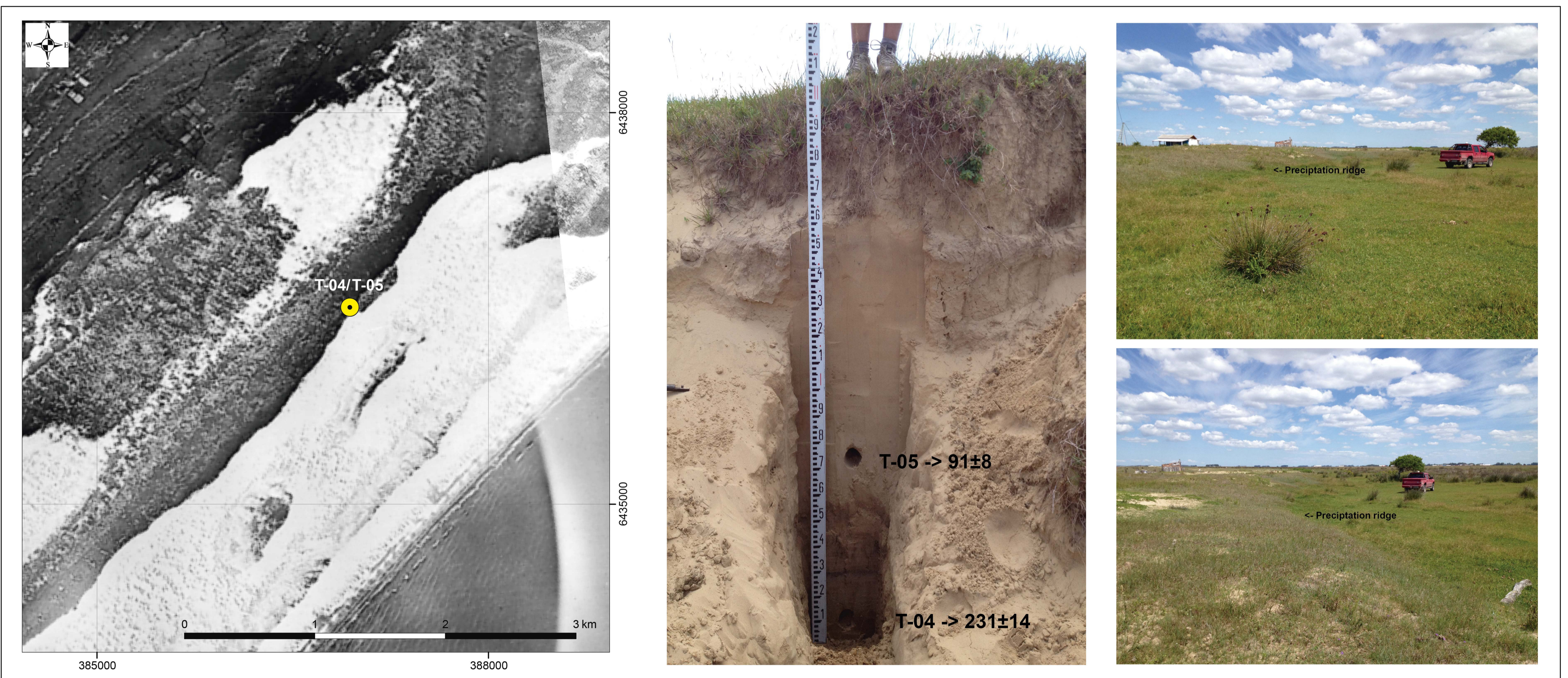


Fig. 2 – Detail of the relatively modern phase of transgressive sand sheets formation at Cassino.

References

- Guerra, L., Piovano, E.L., Córdoba, F.E., Tachikawa, K., Rostek, F., Garcia, M., Bard, E., Sylvestre, F., 2017. Climate change evidences from the end of the Little Ice Age to the Current Warm Period registered by Melincu e Lake (Northern Pampas, Argentina). *Quaternary International* 438, 160-174.
Iriondo, M., Krohling, D., 2007. Geomorfología y sedimentología de la cuenca superior del río Salado (sur de Santa Fe y noroeste de Buenos Aires, Argentina). *Latin American J. Sedimentology and Basin Analysis* 14, 1–23.
Martinho, C.T., Hesp, P.A., Dillenburg, S.R., 2010. Morphological and Temporal Variations of Transgressive dunefields of the Northern and Mid-littoral Rio Grande do Sul coast, Southern Brazil. *Geomorphology* 117, 14–32.
Mathes, F. (1939), Report of Committee on Glaciers, April 1939, *Eos Trans. AGU*, 20, 518–523.

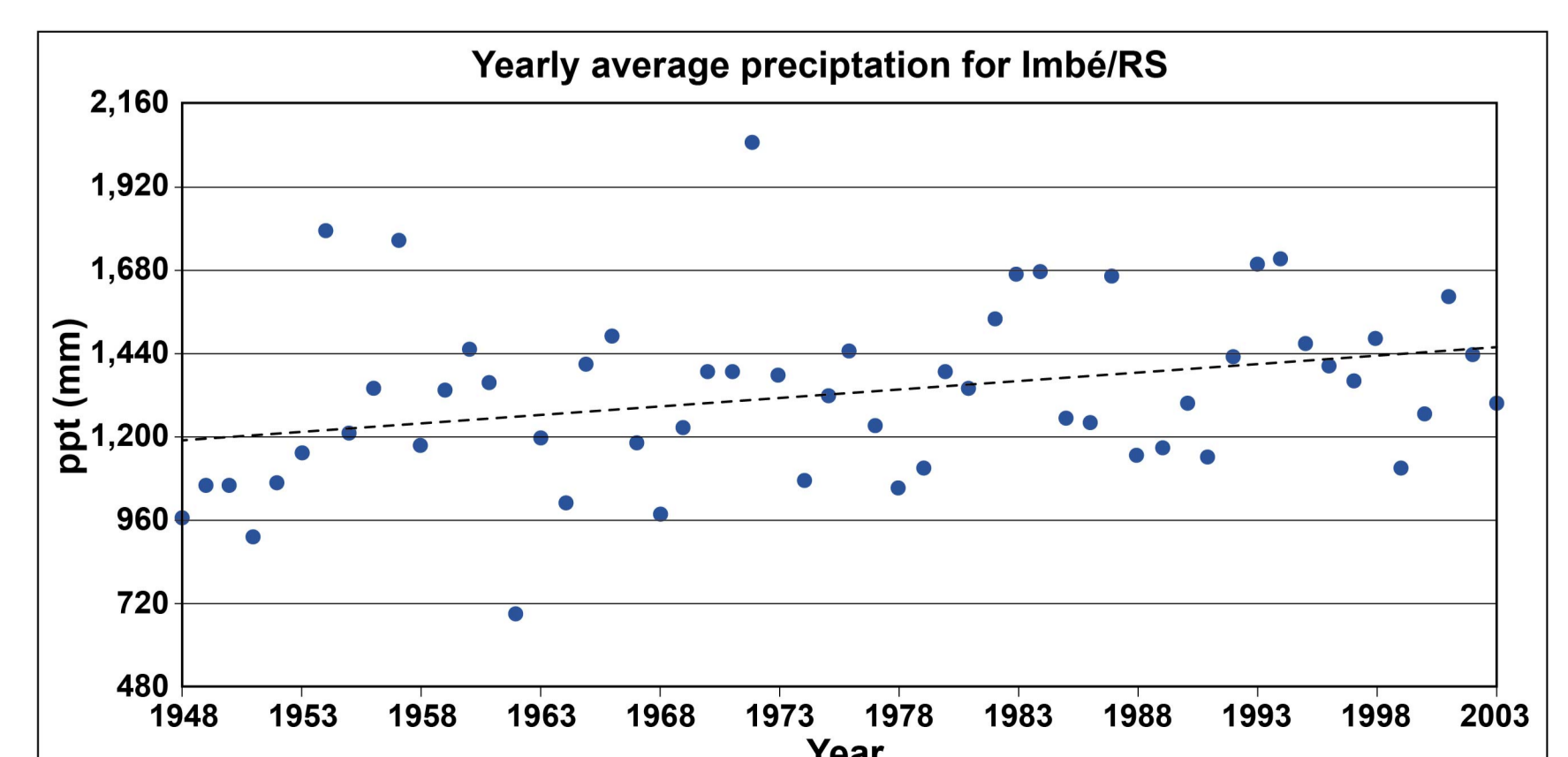


Fig. 4 - Yearly average precipitation for Imbé station. The trend dashed line shows an increase in the precipitation (Martinho et al., 2010).