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# 2000 years of grazing history and the making of the Cretan mountain landscape (Greece).

Isabelle Jouffroy-Bapicot\*<sup>†1</sup>, Boris Vanni re<sup>2</sup>, Virginia Iglesias<sup>3</sup>, Maxime Debret<sup>4</sup>, and Jean-Fran ois Delarasse<sup>3</sup>

<sup>1</sup>UMR 6249 - Laboratoire Chrono-environnement (UMR 6249 - Laboratoire Chrono-environnement) – Universit  de Franche-Comt  – P le Universitaire BP 71427 25211 Montb liard cedex, France

<sup>2</sup>UMR 6249 CNRS-UBFC Chrono-environnement (Chrono-environnement) – Universit  de Franche-Comt  : UMR6249 – 16 route de Gray F-25030 Besan on cedex France, France

<sup>3</sup>UMR 6249 CNRS-UBFC Chrono-environnement (Chrono-environnement) – Universit  de Franche-Comt  – 16 route de Gray F-25030 Besan on cedex France, France

<sup>4</sup>Morphodynamique continentale et c ti re (M2C) – Universit  de Rouen, CNRS : UMR6143 – Morphodynamique Continentale et C ti re Universit  de Rouen B t.IRESE A, Place Emile Blondel 76821 Mont-Saint-Aignan Cedex, France

## Abstract

Understanding the processes that led to the recent evolution of Mediterranean landscapes is a challenging question that can be addressed with paleoecological data. Located in the White Mountains of Crete, Asi Gonia peat bog constitutes an exceptional 2000-years-long sedimentary archive of environmental change. In this study, we document the making of the White Mountains landscape and assess human impact on ecosystem trajectories. The paleoenvironmental reconstruction is based on high-resolution analyses of sediment, pollen, dung fungal spores and charcoal obtained from a 6-m core collected from the bog. Multiproxy analyses and a robust chronological control have shed light on anthropogenic and natural processes that have driven ecological changes, giving rise to the present-day Mediterranean ecosystem. Our results suggest that sediment accumulation began during the transition from the Hellenistic to the Roman period, likely due to watershed management. The evolution of the peat bog as well as vegetation dynamics in the surrounding area were linked to past climate changes but were driven by human activities, among which breeding was of great importance. Charcoal analysis reveals that fire was largely used for the construction and maintenance of sylvo-agropastoral areas. Pollen data allow the identification of three main vegetation assemblages: 1) evergreen oak forest (before ca. 850 AD), 2) heather maquis (ca. 850 to 1870 AD), 3) phrygana/steppe landscape. Rapid changes between phases in vegetation development are associated with tipping-points in ecosystem dynamics resulting from anthropogenic impact. The modern ecosystem did not get established until the 20th century, and it is characterized by biodiversity loss along with a dramatic drying of the peat bog.

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\*Speaker

<sup>†</sup>Corresponding author: Isabelle.Jouffroy@univ-fcomte.fr