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## RECONSTRUCTING THE LAST 3000 YEARS CLIMATE CHANGE IN N-ITALY FROM FOSSIL POLLEN ARCHIVES

**ABSTRACT:** VALLÉ F., FURLANETTO G., PINI R., BRUNETTI M., MAGGI V. & RAVAZZI C., *Reconstructing the last 3000 years climate change in N-Italy from fossil pollen archive*. (IT ISSN 0391-9838, 2019).

We applied a newly established procedure to quantitatively estimate summer temperatures during two different time frames (the last 3 ka, the last 200 years) from selected fossil pollen records in northern Italy. The adopted procedure involved three steps: 1) the development of a specific calibration set (modern pollen data and site-specific climate data); 2) the application of numerical methods to the specific calibration set in order to create pollen-climate models based on the relationships between these variables; 3) the application of these models to fossil pollen records. The evaluation of pollen-climate calibration models and of the resulting past climate reconstructions is based on the comparison with instrumental series and with other independent climate proxies.

**KEY WORDS:** Pollen-climate models, Site-specific climate data, Instrumental series, Summer temperature, Late Holocene, N-Italy.

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Per stimare in maniera quantitativa le temperature estive per diversi intervalli temporali (gli ultimi 3 mila anni e gli ultimi 200 anni) da record

pollinici fossili selezionati in N-Italia è stata impiegata una procedura messa a punto in anni recenti. La procedura adottata si articola in tre fasi: 1) lo sviluppo di uno specifico dataset di calibrazione (dati pollinici moderni e dati climatici sito-specifici); 2) l'applicazione di metodi numerici a tale dataset per ottenere modelli polline-clima basati sulle relazioni tra queste variabili; 3) l'applicazione dei modelli sviluppati ai record pollinici fossili. La validazione dei modelli di calibrazione polline-clima e delle ricostruzioni ottenute si è basata sul confronto con le serie strumentali e con altri proxy climatici indipendenti.

**TERMINI CHIAVE:** Modelli polline-clima, Dati climatici sito-specifici, Serie strumentali, Temperature estive, Olocene superiore, N-Italia.

### INTRODUCTION

Pollen-climate calibration models based on modern relationships between pollen assemblages and associated climate data can be used to obtain quantitative reconstructions of past climate parameters from fossil pollen data (e.g. Brewer & *alii*; 2007; see Vallé & *alii* in this volume). In this work, we present the application of the so-called “three steps approach” procedure, described by Juggins & Birks (2012) and summarized in another contribution in this volume (Vallé & *alii*, this volume). We will hereby estimate climate parameters for selected fossil records spanning the last 3000 years in the alpine and pre-alpine regions of N-Italy. The diversity of modern pollen deposition sampled in northern Italy, responds most significantly to summer temperature, differently from the southern Italian regions, where modern pollen assemblages are more influenced by January and July temperatures and winter precipitation, as shown by Finsinger & *alii* (2007).

### SELECTING A N-ITALY POLLEN-CLIMATE CALIBRATION SET PROVIDED WITH SITE-SPECIFIC CLIMATE DATA

The first requirement of the “three-steps” procedure mentioned in the previous paragraph is the development

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