SUMMER TEMPERATURE CHANGES FROM TREE RINGS IN THE MEDITERRANEAN AREA DURING THE LAST 800 YEARS

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ABSTRACT. Reconstructions of the mean summer temperature (June to September) for Rome, Marseille and Grand St-Bernard from 1150 to 1972 are based on four tree-ring series of the Alps and of the Mediterranean region. They indicate a succession of alternately cold and warm episodes, the longest and most recent being the so called "Little Ice Age".

INTRODUCTION

In dendroclimatology, ring-widths or parameters derived from densitometric measurements of wood are used to reconstruct the temperature and precipitation history. For a few years tentative reconstructions of climatic parameters, based on tree rings and regarding the preinstrumental time, have been developing in Europe (Schweingruber et al., 1978; Eckstein and Aniol, 1981; Bircher, 1982; Aniol and Eckstein, 1983; Briffa et al., 1983; Bednarz, 1984; Hughes et al., 1984; Jones et al., 1984; Guiot et al., 1982 a, b, 1984 a, b, 1985, 1986). The tree-ring series are provided by several taxa, mainly conifers from relatively high altitudes: Pinus silvestris L., Pinus cembra L., Picea abies Karst, Larix decidua Mill., Cedrus atlantica Manetti. However, for the reconstruction of the riverflow of three river catchments in southern Britain, Jones et al. (1984) used oak (Quercus petraea Liebl. and Quercus robur L.). The reconstructions mainly concern mean "summer" temperatures, the temperature of 1, 2 or 3 months from June to September, on different periods and in different meteorological stations (Table 1).

Here we are concerned with the reconstruction of the mean temperature of the four summer months June to September, during the period 1150-1972, at Rome (Italy), Marseille (France) and Grand St-Bernard in the Pennine Alps. This period is particularly interesting because it includes the so-called "Little Ice Age" which was marked by an unusual number of cool summers in western Europe and elsewhere (Pfister, 1980; Le Roy Ladurie and Baulan, 1981; Lamb, 1982, 1984).
Figure 1. The indexed tree-ring master chronologies: A: Les Merveilles; B: L’Orgère; C: Calabria; D: Mont-Ventoux.

Figure 2. Reconstructions of summer temperature (°C departure from mean) in 1) Rome, 2) Marseille, 3) Grand St-Bernard, 4) decennial index of summer (June+July) rainfalls in Belgium, Germany and Northern France from Alexandre (1977).