

Absolute dendrochronological scale in the XIVth century for the north coast of Peru

The radiocarbon dating method based on using the radioactive carbon isotope of mass 14 (¹⁴C) to determine the age of objects containing carbon, was developed by Willard F. Libby, in the late 40's of the last centuries, who the first produced radiocarbon date. It quickly found a wide application in archaeology and geology to the dating of organic objects of unknown age. Soon it became clear, that the first assumption made by Libby, of a constant radiocarbon concentration in the past, was wrong. There are natural and anthropogenic phenomena which may change either the production rate of this isotope in the atmosphere, or due to which its concentration in each reservoir changes over time. It means that to obtain correct age of the sample is necessary to apply the "calibration curve", which linked radiocarbon age with calendar age.

The radiocarbon concentration differences between the NH and the SH, force the creation of separate calibration curves for both hemispheres. In the youngest period, those curves were built based on radiocarbon concentrations in tree rings that were previously dated dendrochronologically. Early calibration curves represent average radiocarbon concentration in periods of 5 or 10 years. In the newest curves, IntCal20 and SHCal20, many periods were substituted with one-year-resolution measurements based on annual tree rings. The SHCal20 is built mostly using material from New Zealand, Australia and Patagonia and not includes material from the low latitude's sites, since there are difficulties to collect material for such measurements.

The proposed project aims 1). to develop of the dendrochronological timescale for the algarrobo tree (*Prosopis sp.*) based on a sequence spanning the XIVth century ring sequences, 2). To prepare absolute dendrochronological scale for this region, and 3). to obtain radiocarbon calibration curve for this area based on high-precise radiocarbon dates. The project will be divided into 2 parts including 1). dendrochronological measurements of tree rings sequences and 2). radiocarbon and stable isotopes analysis of the annual tree rings to provide absolute scale and to obtain climatic information for the investigated region, which is to create the possibility of preparing new radiocarbon calibration curve for low latitude regions of South America to obtain more precise results for calibration of radiocarbon dates.