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Onset of 14C "Bomb pulse" as a time marker of mid 20th century

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Naturally, atmospheric 14C is produced in the atmosphere by thermal neutrons, which are secondary Cosmic Rays, interacting with nitrogen. This process can be traced back to the last 50 thousand years, which is the limit of the radiocarbon dating method as dictated by its half-life of 5730 years. During the last 200 years the pristine pool of cosmogenic 14C in the atmosphere and connected reservoirs (biosphere, ocean, soils etc.,), has been perturbed by human activities. Two anthropogenic effects left their imprint on the 14C concentration of the atmosphere: combustion of fossil fuels leading to dilution of the atmosphere with 'old' carbon dioxide since the start of the industrial revolution (Suess effect) and nuclear tests of the 1950/60ties creating an excess of artificially produced 14C (Bomb pulse). Despite the fact that fossil fuel combustion started earlier and has a massive impact on the present atmosphere including 14C concentration, it is the 14C 'bomb pulse' that is most suitable as a marker of anthropogenic activities. Easily detectable in all carbon-bearing material, it can be used as a time marker for detecting the 1950ties. The compiled data (Hua et al. 2013) reproduce the global and regional changes in atmospheric 14C since 1950. In order to improve resolution here, we focus on the years bracketing the onset of the 1950-1960 'bomb pulse'.

Hua Q, Barbetti M, and Rakowski AZ. 2013. Atmospheric Radiocarbon for the Period 1950-2010. Radiocarbon 55: 2059-2072.