Isotope and pollen records from lacustrine marls with EU-5 tephra from the Avellino eruption (1995 +/- 10 calBC) in the Agro Pontino, Lazio, Italy
The 4.2 ka BP event recorded?

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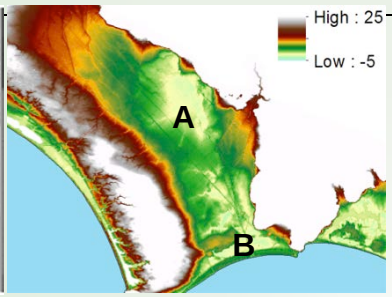
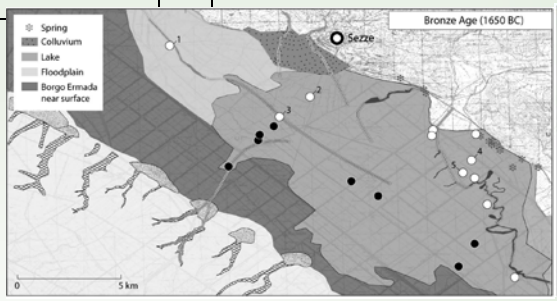
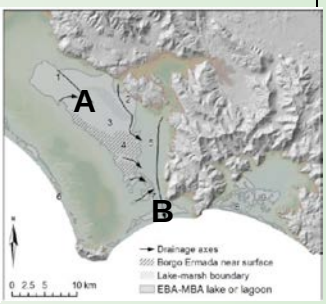
In the Agro Pontino two sedimentary units hold lacustrine marls of Mid-Late Holocene age

In the *central part of the graben (**A**)*, a lake formed by damming of a Würmian incision in the earlier (Eemian) Borgo Ermada marine terrace by the Amaseno river, building up an alluvial fan in the coastal plain as a result of Holocene sea level rise. At the foot of the Monti Lepini, karstic springs and associated lacustrine marls abound. The latter are largely formed by chemical precipitation from the karstic waters. The lake deposits hold a more or less continuous EU-5 tephra layer.

In the *coastal area (**B**)*, fluvial incisions dating back to the Würmian period were successively filled with Holocene marine, lagoonal/lacustrine, and fluvial deposits. Open marine conditions changed to lagoonal /lacustrine conditions by closure of the beach ridge near Terracina, shortly before the Avellino eruption. Lacustrine marls with intercalated EU-5 tephra abound in the coastal area.







Hypothesis: 4.2 ka BP climatic event is recorded in the lacustrine marls of the Agro Pontino

Change in temperature reflected in isotopic composition of calcium carbonate ($\delta^{13}C$ and $\delta^{18}O$)

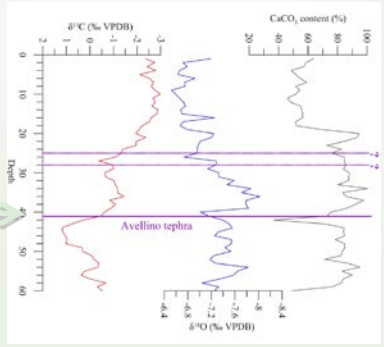
Pollen diagram and its interpretation: shift in vegetation and translation into shift in climate

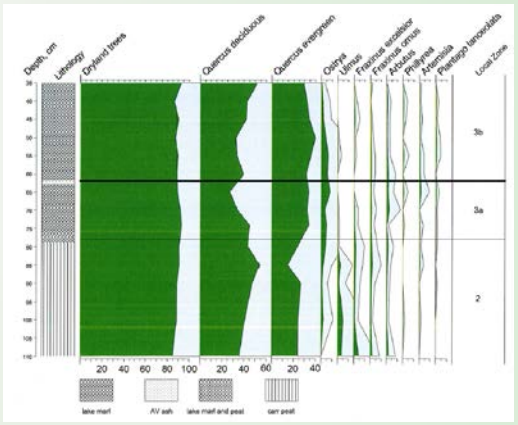
Pilot study of Mezzaluna core (4)

Results:

Before AV-tephra:

- shift in isotopic composition and
- shift in Quercus species (warmer/drier)





Problems:

- Isotopic composition may change because of changing ratio in contribution of water by river versus karstic springs.
- Lacustrine marls are unsuited for ^{14}C dating.

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Solutions and ongoing research:

- Isotopic studies of lacustrine muds in coastal area with far less potential variations in origin of the water.
- ^{14}C dating of relevant parts of peat sections and of vegetation changes observed.
- Check on origin of the calcareous muds (biogenic versus inorganic).