

## [H-TT35\_1PM1] Developments and applications of AMS techniques for earth and human environmental research

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Accelerator mass spectrometry (AMS) is a technique developed in 1977, to detect and count the small amount of nuclides in the environment, and to measure precisely the isotope ratios of the nuclides. In particular, by means of measuring rare radioisotopes in the environment, AMS techniques are applied for age measurement of samples from various application fields, such as geology, archeology and cultural properties. AMS can measure isotope ratios in the order of as low as  $1.0\text{E}-10$  to  $1.0\text{E}-16$ , by the process of producing negative ions of specific nuclides by an ion source, accelerating the ions by a tandem accelerator, analyzing mass of the isotope ions by an analyzing magnet, and identifying the specific nuclides by an ionization detector. Thus AMS is used to measure isotope ratios of natural radionuclides of quite low natural abundances. AMS can be applied for studies of materials recycling and environmental science by using rare isotopes as a chemical tracer, and investigations of time sequence of tephra layers, land deposits, lacustrine and ocean sediments that are quite important for Quaternary research. This session offers a brief outlook of present status on technical progresses going on present days and interesting application programs, given by specific researchers and students engaged in AMS studies.

2:15 PM - 2:30 PM

## [HTT35-P04\_PG] Radiocarbon dating of archeological remains related with the 13th century Mongol Invasion to Japan

3-min talk in an oral session

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The shallow sea floor off Takashima, Matsuura, Nagasaki Prefecture, has been investigated archeologically as a potential site where many Mongolian warships exist under the sea sediments. It is historically recorded that more than 4000 Mongolian warships were destroyed by a typhoon during the Mongol invasion to Japan in 1281. The underwater investigations have been performed since 1980, and a lot of archeological remains related with the invasion have been collected there. In 2006, we were allowed to get some archeological remains for  $^{14}\text{C}$  dating with AMS. The samples were fragments of palm-bark ropes, lacquer products, bamboo ropes and charred rice.  $^{14}\text{C}$  ages for the samples were all consistent with the age of Mongol invasion in 1281. Recently a body of submerged wrecks most probably originated from Mongolian warship has been discovered in the 1m-deep horizon of the sea sediment off Takashima. During the survey of the new warship, shell samples were collected near the ship. Some shells were recognized to be hull-fouling species, which may have grown up on the bottom of Mongolian warship and preserved along with the broken ship in the sea sediment. We have conducted  $^{14}\text{C}$  dating for some shell samples and found out that shells belong to hull-fouling species showed  $^{14}\text{C}$  ages consistent with the time of Mongol Invasion. Some other shells not belonging to hull-fouling species showed younger or

older dates as compared with the time of Mongol invasion.