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Erosion on Taiwan: trace element and (Sr, Pb, Zn) isotopic approach

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Taiwan Island is located at the collision boundary between the Philippine Sea Plate and the Asian Continental Plate. This young orogen is not only an active collision zone formed by the Luzon arc indentation with Asian, but also a transform region between the opposing Luzon and Ryukyu subduction system. The very high rate of erosion on Taiwan makes this orogen an important source of sediments. A comparison between trace element concentrations and isotopic compositions (Sr, Pb, Zn) of the detritic part of the marine sediments and the results obtained on samples from Taiwan should allow identifying the sedimentary contribution of Taiwan orogen versus the sedimentary contributions by oceanic currents (i.e. Yellow sea, Kuroshio) and atmospheric dust (i.e. China Loess).

Five marine cores offshore Taiwan have been analyzed and compared to continental samples of andesites, sandstone, limestone and Taitung River suspended load which give best estimate of Taiwan end-member.

Sr and Pb isotopic results on the marine cores are very spread out for the silicate fraction: the core located in the Okinawa basin shows the more radiogenic compositions, which can be modeled by mixture between Taiwan rock and Yellow Sea sediment contributions. In contrast, core samples close to Luzon arc present typical volcanic isotopic signatures. Mixing lines between the different potential end-members evidence that the marine core samples represent mixture between volcanic arc, Taiwan sedimentary material and Yellow Sea Sediment (i.e. Yellow River and China Loess). The contribution of the volcanic arc seems to be negligible in the Okinawa basin ($<5\%$): indeed, the present day Okinawa sample would represent a mixture between about 60% of Taiwan contributions and about 40% of China loess.

We report the preliminary Zn isotopic results on sediments around Taiwan measured on silicate fractions and Taiwan bulk samples. Zn isotopic compositions of the detritic part of marine sediment present clustered values similar to the literature data measured on sedimentary material, except for the Manila trench core which presents the highest values, close to those obtained on Taiwan rocks. The results obtained on the Manila trench core comfort the Sr and Pb isotopic data, and pave the way for the use of Zn isotopes as geochemical tracer.