Two samples of K-feldspar from the Trans-Antarctic Mountains (77.5°S), apparently saturated with $^{36}Cl$, give production rates of 1350 ± 50 atom $(gK)^{-1}$ $a^{-1}$ at 2050 m and 1230 ± 40 atom $(gK)^{-1}$ $a^{-1}$1 at 2000 m, with negligible (<2%) corrections for neutron capture on $^{35}Cl$. Equivalent rates at sea level, scaled as above are $P_K$ = 239 ± 10 and 227 ± 8 atom $(gK)^{-1}a^{-1}$. The samples have been measured repeatedly to confirm that the 25% discrepancy with the scaled values from Scotland and the Sierra Nevada is real and must be accounted for either by the scaling procedure, or secular variation in the cosmic ray flux.

## Reference

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## PRE-ANTHROPOGENIC $^{129}I$ IN THE MARINE SYSTEM: OBSERVATIONS AND APPLICATIONS

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$^{129}I$, the only long-lived radioisotope of iodine, is of interest because of its potential applications for tracing and dating of processes in the age range between 5 and 80 Ma. The biophilic nature of iodine and the low abundance of this element in rock-forming minerals sets this system apart from other isotopic systems. The main production modes for $^{129}I$ are the interaction of cosmic rays with Xe isotopes in the atmosphere and the spontaneous fission of $^{238}U$ in the crust. In order to apply this system successfully, the input function and behavior of this isotope in the marine system has to be understood. We report here results from the determination of $^{129}I/I$ ratios in marine sediments, deep waters and marine organisms which were undertaken in order to determine the pre-anthropogenic signal of this isotopic system in the oceans.

The results suggest a pre-anthropogenic $^{129}I/I$ ratio of $1500 \times 10^{-15}$, in good agreement with earlier studies done in marine sediments. However, variation in the ratios in most of the sediment cores was found to be much larger than the experimental error. The most likely interpretation of this variation is related to the presence of a fossil carbon component in the marine sediments. Because this fossil carbon does not participate in the active carbon cycle, iodine bound to it will preserve the age of its original formation. The oldest iodine was found in a core off the Oregon coast with a ratio of $354 \times 10^{-15}$, suggesting Miocene age for the fossil carbon in this core.

Our results indicate that iodine is present in two major forms in the marine system: a labile constituent which is readily available for incorporation into organic organisms and a component which is bound to refractory carbon and does not participate in the iodine recycling in the oceans. Our results show that the labile component is well mixed in the marine reservoir and has an input ratio of $1500 \times 10^{-15}$. Since organisms will take up the labile component, this ratio is to be used for the calculation of ages using $^{129}I$ in hydrologic systems or in organic material. The association of $^{129}I$ with fossil carbon opens up the possibility of determining age and amount of refractory carbon, an important question for the understanding of the global carbon cycle.

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