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Interactive comment on "The 129-Iodine content of subtropical Pacific waters: impact of Fukushima and other anthropogenic ^{129}I sources" *by* T. P. Guilderson et al.

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The Guilderson et al. paper illustrates the importance of assembling a detailed inventory of iodine-129 in the world's oceans, particularly in light of the Fukushima nuclear disaster. As mentioned in the introduction, iodine-129 can be used to provide retrospective dosimetry estimates of iodine-131 releases. The authors use two sampling transects to determine the variations in iodine-129 relative to stable iodine and radiocesium, present the spatial distribution and speculate as to the amount of iodine-129 discharged into the oceans directly due to the accident ($\sim$137 - $\sim$179 g). The authors note (section 4.3) that iodine-129 measurements are not made as frequently as I-131,

but it is precisely the longer half-life of iodine-129 that has allowed many more samples to be made of iodine-129 than of iodine-131 following the nuclear accident (see, for example, Miyake et al, 2012, Geochem. J. or retrospective dosimetry papers on Chernobyl) As a side note, it is worth mentioning that while the North Sea and Northeastern Atlantic Oceans have been adequately studied, only sporadic sampling for iodine-129 has been carried out for the rest of the world's oceans. While the author's presume a large pulse from the Columbia River, for example, due to the Hanford Project, the data we have is limited to: 1) seaweed (Kilius et al, 1994) who found that radioiodine was effectively scavenged out by macroalgae within 100 km of the Columbia River estuary; 2) River water and water from local streams (Moran et al., 2002), which does not seem to be much different from regional background values; and 3) shoreline springs, streams and monitoring wells surrounding the Hanford project (Patton et al., 2003, 2009). The Patton studies show that iodine-129 is localized and has not migrated as extensively as Tritium, for example, and the authors of the Hanford studies surmise that even in river water it is rapidly sorbed and scavenged out by sediments. I mention this because in order to make a qualitative assessment as to the contribution of iodine into the world's oceans, we need quantitative data in all of the world's oceans, preferably with repeated sampling over time. The complete absence of data along the Pacific Shores of the United States is not unique. While there is ample evidence for a large iodine-129 plume associated with the Savannah River project (Kaplan et al, Environ. Sci. Technol., 2011), there has been no sampling for I-129 in seawater along the mid-Atlantic states either. In the Pacific Ocean, the are studies of Bikini and Einewetak do not include background transects, so it is hard to say whether the "bomb pulse" currently extends to any appreciable distance away from these two point sources. Guilderson's work is a start in the right direction, but I think there should be some reservation in providing a firm interpretation of the data until we have know more. The authors tendency, for example, to be somewhat dismissive of the penetration depth of Hou et al. (2013) as a series of "unresolved issues", the regional elevation of I-129 in pre-Fukushima waters indicated by Povinec et al (2013) as "if real", and values from Monaco as "inadvertent

contamination", simply highlights the level of uncertainty even with the interpretations of this paper until we have more data. At present, there is more data regarding 129I/I ratios in rivers, lakes, and streams near coastal areas. While I-129 concentrations tend to be lower in streams than in shallow seawater, the ratios tend to be remarkably similar (Snyder et al., 2010). Because of this, it is essential that when iodine carrier is added to samples, that the stable iodine concentration of the sample is known, in order to actually calculate 129I/I ratios in seawater, since the iodine concentration can change. (Incidentally, Guilderson's paper is unclear about what the 129I/I ratio of the carrier that was used is, if the value varied between sample runs and what errors were propagated as a result of this.). Although the iodine ratios from coastal surface waters are no substitute for actual seawater samples, perhaps they can be used until we actually have a more complete data set of marine values. It might be mentioned that there is more data from Japan that could be incorporated into the interpretive section of this paper. Ohno et al. (Geochem J. 2012) provide 134/137 ratios of 0.98 in shallow sediments around Fukushima, Toyama et al. (J. Env. Rad., 2012) provides a look at the variations in atmospheric deposition of 129I prior to the accident. Incidentally, the Ohno paper shows 131I/137Cs values that are much lower than those assumed in section this paper, which highlights the uncertainty of these assumed ratios. Finally, although the author's present estimated 129I/I values to "afford simple comparison", they choose to plot this against potential density, rather than depth, which makes it difficult, if not impossible, to compare side-by-side with other studies that present values relative to seawater depth.

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