Hotspot Drift vs. True Polar Wander

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Fixed hotspot is one of the first idea for the Plate Tectonics about 40 years ago, and is still useful for the calculating absolute plate motions and the true polar wander path. Recently, however, simulated models of hotspot drifts by such as Steinberger et al.,2004 have become popular, more people accept the idea that hotspots can drift several centimeters a year. It is important to clarify the velocity distribution of global hotspots for understanding global mantle dynamics. One can regard easy to estimate the velocities by calculating discrepancy between observations and fixed hotspot model, but it is rather hard to do that. There are two reasons for it. First, positions and ages of hotspot seamounts on a plate may be explainable with fixed or very slow moving hotspot model if a proper model of the plate motion introduced. Second, southward drift of paleolatitude of Hawaii-Emperor chain (Tarduno et al.,2003) can be explain not only by hotspot drift but by true polar wander. Thus, we need to know as accurate true polar wander path as possible.

In this paper, I would like to summarize results of data analysis related to the topic, and like to show two important conclusions; observed data is quite consistent with the idea of fixed hotspot or very slow moving hotspots, and southward drift of paleolatitude of Hawaii-Emperor chain can be explainable with newly revised model of true polar wander path. The true polar wander path can be regard as relative motion of spin axis and mantle, and the motion is in harmony with the model of Mantle Roll (Jurdy,1981). Following figure is distribution of global subduction zones by mercator projection with pole at the rotation pole of the Mantle Roll model.