Japanese scientists say giant plumes will prevent new Pangaea

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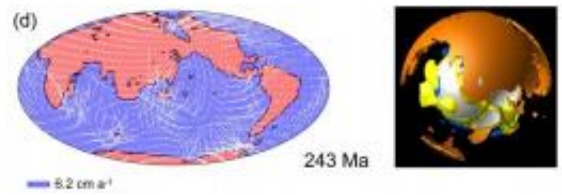

Temporal evolution of deformable continents. Image credit:
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(PhysOrg.com) -- For much of Earth's history, the continents have shifted around, sometimes joining with others, sometimes tearing apart to form new continents. One such shift resulted in what Earth scientists call the Pangaea, or supercontinent, where nearly all of the land mass of Earth was consolidated into one single continent. Many Earth Scientists have predicted that such an event is likely to occur again over the next 250 million years or so. Yoshida and Madhava Santosh of Kochi University, Japan, disagree, if only slightly. They contend in their paper published in *Terra Nova*, that giant plumes far beneath the surface of the Earth will prevent South America and Antarctica from joining each other or the new continent.

The plumes, or hot areas in the mantle some 2800 kilometers below the surface of the Earth, lying roughly between Africa and the South Pacific, are hot enough, the two researchers say, to prevent land masses

settling over them. If they are right, the movement that is now going on, where Africa and Europe are moving towards one another, as are parts of Asia and Australia, would not result in the Pacific ocean being closed off as previous research has suggested. Instead, they say the Pacific Ocean will remain open with South America and Antarctica separate from the rest of the new super continent.

While the origin of the plumes is really not very well understood (some suggest they are remnants of the primordial mantle) the heat they produce emanates up to the surface, raising its level in some cases as much as a kilometer or two. That is enough, most agree, to affect how plates move around relative to them. Until now, however, no one has thought to include the influence of these hot spots in models that seek to show how the continents will drift.

Scientists are able to see how the continents have drifted in the past by studying the magnetic fields in old rock formations. They use this information, combined with the measurable movement of the continents today to come up with models that forecast what will happen in the distant future.

For those that might wonder why such forecasts matter, it's because it adds to the overall knowledge base that describes our one and only habitable planet. The more we as a people learn about how it works, the better able we will be not just survive on it, but to prosper as the uncertain future unfolds.

More information: Future supercontinent assembled in the northern hemisphere, *Terra Nova*, 23, 333–338, 2011. Article first published online: 17 AUG 2011 DOI: 10.1111/j.1365-3121.2011.01018.x

Abstract
Continental masses were amalgamated, broken apart and reassembled

within supercontinents during different times in Earth history. Here, we attempt to predict the configuration of a potential future supercontinent based on a numerical simulation model of mantle convection. The mantle convection in our model is driven by a density anomaly compiled from a global seismic tomography model. The temporal evolution of a highly viscous continent with an initial present-day configuration is simulated for over 250 Ma. The result reveals that Australia, Eurasia, North America and Africa would gather in the northern hemisphere to form the future supercontinent. On the other hand, Antarctica and South America remain in the present-day position even after 250 Ma from present, and do not join the future supercontinent amalgam. The configuration of the future supercontinent numerically simulated herein is broadly consistent with the hypothetical model of the future supercontinent Amasia speculated from geological correlations.