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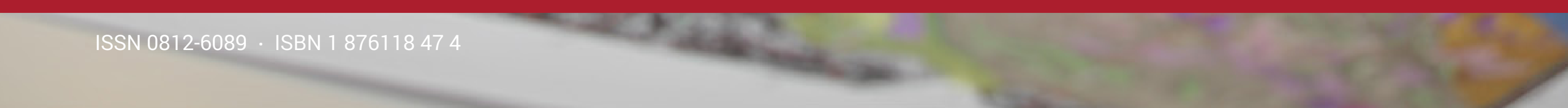

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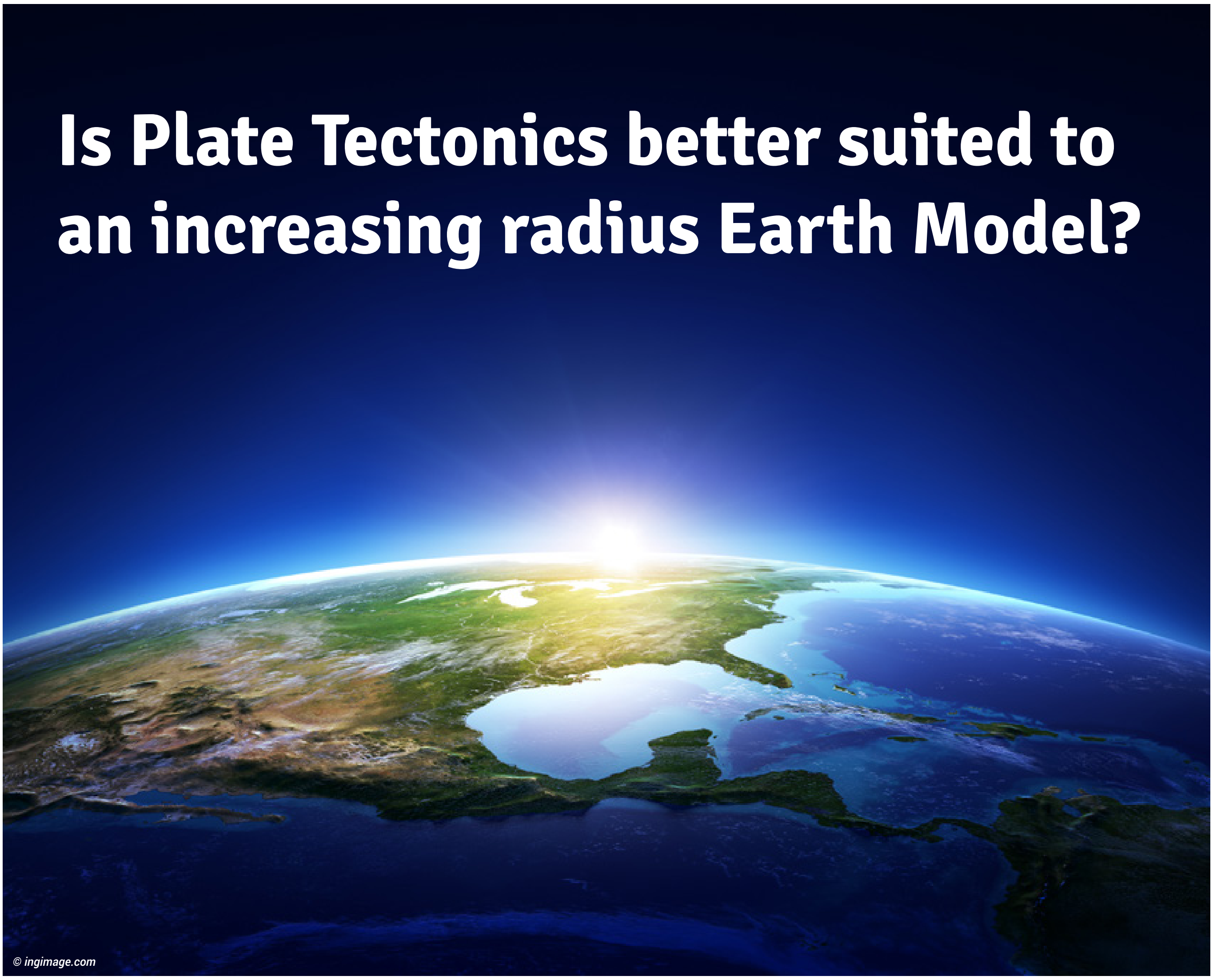
Is Plate Tectonics better suited to an increasing radius Earth Model?



Dr James Maxlow, Retired Professional Geologist

Considering the vast amount of research effort that has gone into making sure plate tectonics remains the dominant tectonic theory in science today, plate tectonics on anything other than a constant radius Earth model may seem counterintuitive and counterproductive. In fact, apart from its implicit assumption of a constant radius Earth, there is very little in plate tectonic observational data that is incompatible with the largely historical expanding Earth theory, and vice versa. It is the same global data gathered about the same Earth. What is exemplified in this paper is rather than continuing to insist that we confine modern plate tectonic observational data and plate tectonic thinking to a mathematically constrained constant-sized Earth—the current dogma—we must at least test this observational data by using global geology to see if the data, and hence the basis of plate tectonic theory, are better suited to an increasing radius Earth scenario. This test has never been done using modern observational data and hence urgently needs to be done before continuing to ridicule and unscientifically reject this proposal out of hand.

The testing and quantification of plate tectonics on an increasing radius Earth model is based on an extensive range of modern global data from the fields of geology, geography, biogeography, palaeoclimate, palaeomagnetics, metallogeny, fossil fuels, and space geodetics. Two important contributions to scientific understanding of the Earth, which are particularly relevant, have only been available since 1990 and 2000 respectively. These include:

- Completion of bedrock geological mapping and age dating of all continental and seafloor crusts (Geological Map of the World, CGMW & UNESCO, 1990), and
- Post-year 2000 space-based near Earth data collection and recognition of the significance of large quantities of solar wind related charged electron and proton particles entering the Earth (European Space Agency).

In the modelling study briefly introduced here heavy reliance is placed on the published Geological Map of the World map (CGMW & UNESCO, 1990) (Figures 1 & 2) to geologically constrain assemblage of both the oceanic and continental plates back in time.

In order to constrain plate assemblage, all mathematical-based preconceptions about Earth surface areas are simply ignored in order to both measure the ancient surface area of the Earth and establish a formula to determine an ancient Earth radius at any moment in time. This geological mapping and measured surface area data are then used to accurately constrain plate assemblages on small Earth geological models of the ancient Earth extending from the early-Archaean, some 4,000 million years ago, to the present-day plus one model extended to 5 million years into the future.

The seafloor geological mapping shown on the Geological Map of the World was initially used to constrain the location and assemblage of all seafloor crustal plates on smaller radius Earth models (Figure 3). Moving back in time, this assemblage involves progressively removing each coloured seafloor stripe in turn and refitting all remaining plates back together along their respective mid-ocean-ridge spreading zones. This geological assemblage method contrasts strongly with the apparent-polar-wander based assemblage used in conventional plate tectonic modelling studies.

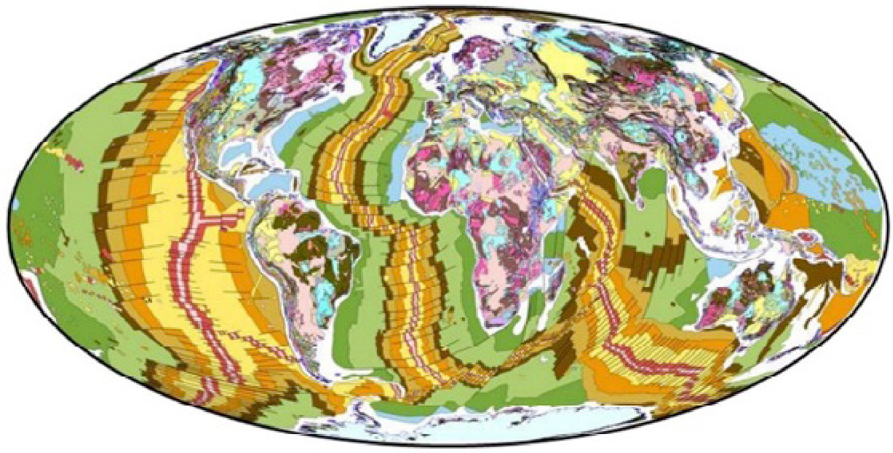


Figure 1. Geological Map of the World (CMGW & UNESCO, 1990) showing time-based bedrock geology reproduced in Mollweide projection.

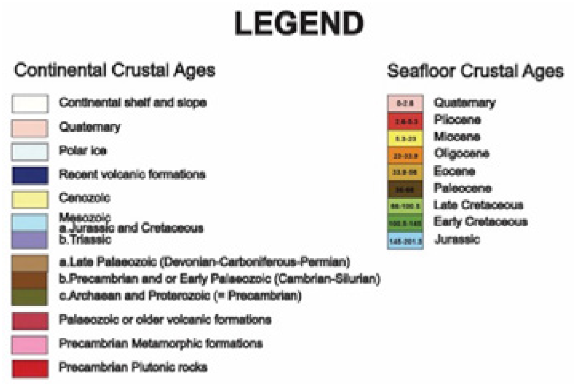


Figure 2. Geological timescale legend showing the various colours of the continental and seafloor crustal ages as shown in Figure 1. Seafloor crustal ages are in millions of years before the present-day.

Modelling the seafloor crustal plates on small Earth models consistently show that all plates assemble back in time with a single unique fit, where all plates assemble together with a high degree of precision along their respective mid-ocean-ridge spreading zones. This single unique plate-fit contrasts with the multitude of poorly constrained plate-fit options and ill-defined schematic supercontinental assemblages proposed by conventional palaeomagnetic studies. The uniqueness of small Earth assemblages also contrasts strongly with the conventional plate tectonic requirement to arbitrarily fragment continents in order to comply with the seafloor mapping data. It also contrasts with the requirement to dispose of large areas of inferred pre-existing crust beneath subduction zones in order to maintain the maths-based constant surface area premise.

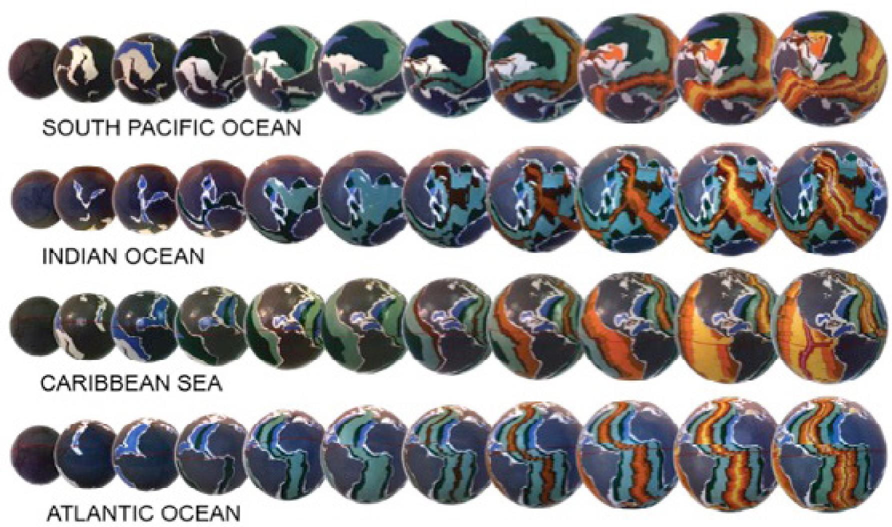


Figure 3. Spherical small Earth models of the Jurassic to present-day increasing radius Earth. Each small Earth model demonstrates that the seafloor crustal plate assemblage coincides fully with seafloor spreading and geological data and accords with the derived ancient Earth radii (Maxlow, 1995).

What is seen from the seafloor small Earth modelling studies is that all remaining continental crusts unite precisely to form a single complete global Pangaean supercontinental crust during the late-Permian

Period, at around 50 percent of the present Earth radius. At that time the bulk of the seafloor volcanic crust, along with much of the atmosphere and hydrosphere, are retained within the mantle from where they initially came from. From this Pangaean supercontinental assemblage, continental sedimentary basins are then shown to merge to form a global network coinciding with relatively shallow continental seas and the ancient supercontinents and seas are, in turn, defined by the variation in coastal outlines and sea-levels.

Testing the application and viability of plate tectonics on small Earth models back to the early-Archaean requires an extension of the fundamental cumulative seafloor crustal premise to include continental crusts. Continental crust is reconstructed on pre-Triassic small Earth models by considering the primary crustal elements cratons, orogens, and basins. In order to construct small Earth models, further consideration is given to an increase in Earth surface area occurring as a result of crustal stretching and extension within an established network of continental sedimentary basins.

Moving back in time, this crustal extension is progressively restored to a pre-extension, pre-stretching, or pre-rift configuration by simply removing young sedimentary and intruded magmatic rocks and reducing the surface areas of each of the sedimentary basins in turn, consistent with the empirical geology shown on the Geological Map of the World (Figure 1). During this process, the spacial integrity of all existing ancient cratons and orogens is retained until restoration to a pre-orogenic configuration is required. By removing all basin sediments and magmatic rocks, as well as progressively reducing the surface areas of the sedimentary basins in turn, a series of small Earth models can be readily assembled back to the early-Archaean (Figure 4). During the early-Archaean the primordial Earth then comprised an

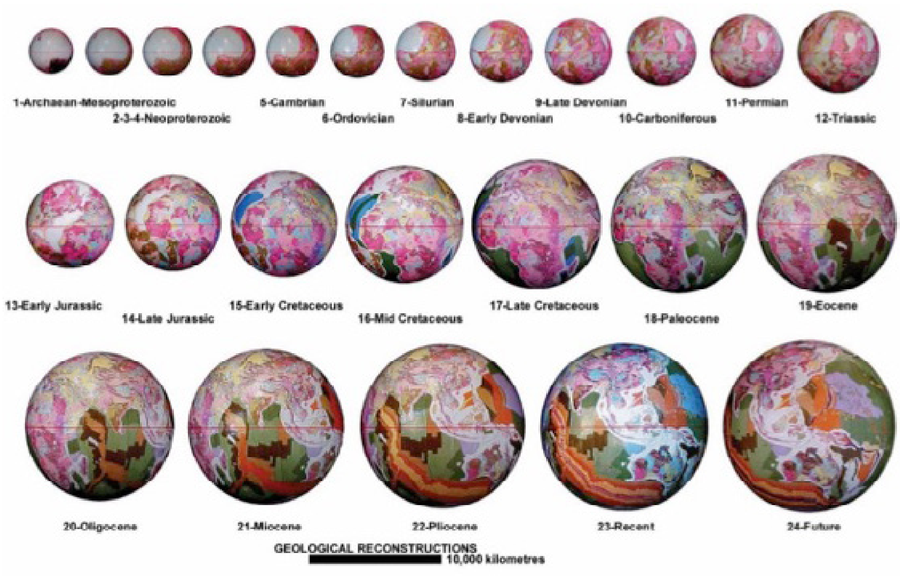


Figure 4. Spherical Archaean to future small Earth geological models. Models show relative increase in Earth radii over time showing both continental and seafloor geology. Models range in age from the early-Archaean to present-day, plus one model projected 5 million years into the future (Maxlow, 2014).

assemblage of the most ancient Archaean cratons and basement rocks existing on Earth today; all other rocks, minerals, and elements are simply returned to their places of origin.

The outcomes of an extensive range of additional data modelling on each of the small Earth models are that:

- Formation of the ancient supercontinents and breakup to form the modern continents as well as sympathetic opening of each of the modern oceans is shown to be predictive, progressive, and evolutionary.
- All diametrically opposed ancient magnetic north and south poles are precisely located using published palaeopole data.
- Established poles and equator coincide fully with observed climate zonation and plant and animal species development.
- Coastal geography defines the presence of more restricted continental Panthalassa, Iapetus, and Tethys Seas, which represent precursors to the modern Pacific and Atlantic Oceans and emergent Eurasian continents respectively.
- Plant and animal species evolution is intimately related to supercontinental development, the distribution of ancient continental seas, and changes to climate zonation.
- Extinction events are primarily related to and coincide with a number of drastic and prolonged changes to sea-levels.
- The spatial and temporal distribution of metals across adjoining continents and crustal regimes enables mineral search and genetic relationships to be extended beyond their known type localities.
- The presence of fossil fuels highlights the global interrelationships of resources coinciding with the distribution of a network of Palaeozoic continental seas and low-lying terrestrial environments.

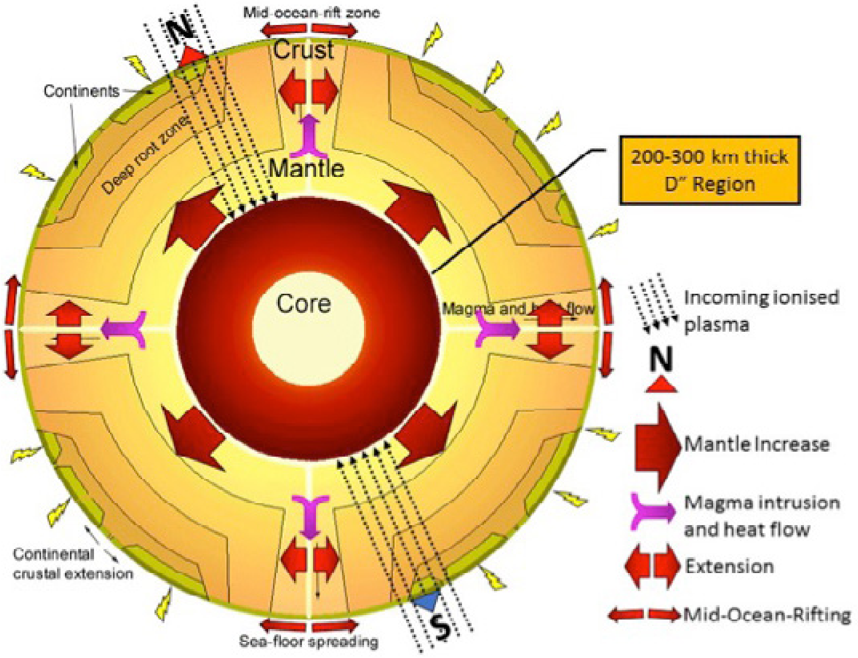


Figure 5. A schematic cross-section of the present-day Earth highlighting the influence of charged electrons and protons entering the Earth resulting in increase in mass and radius over time.

It is fair to say, however, that this is not the problem that people see when modelling plate tectonic data on an increasing radius Earth model. The fundamental problem that scientists and the general public have is comprehending where did the huge volume of material making up the seafloor crusts and underlying mantle go to when moving back in time in order to reassemble the continents? And, more importantly, where does this huge volume of material come from when moving forward in time? From this perceived problem, it would seem that it doesn't matter how unique or empirical the constructed models or data modelling are, if an explanation for these observed phenomena cannot be given to the satisfaction of scientists and the general public alike then all increasing Earth radius theories must remain rejected.

It is fair to then ask the very pertinent question that if an acceptable causal mechanism is proposed, as palaeomagnetics did for the rejected continental drift theory during the 1950s, do we seriously consider this mechanism, test the new proposal in light of modern plate tectonic observational data, accept the empirical evidence in support of this proposal, and revise the current plate tectonic theory? Or do we continue to turn a blind eye to the observational data and acceptable mechanism and instead remain supportive of an outdated theory based on a pre-assumed mathematically constrained constant Earth radius premise?

In strong contrast to what was available 50 years ago when this increasing radius Earth concept was initially rejected, the influence of charged solar wind-related particles emanating from the Sun on the near Earth environment has only been available since the Cluster II satellites were launched by the European Space Agency in year 2000. The new space-based observational data subsequently collected has highlighted the introduction of large quantities of solar wind-related electrons and protons into the Earth, propelled by the Earth's magnetic field. This influx begs the question as to what is happening to these particles—the building blocks of all matter on Earth—once they enter the Earth?

The proposed causal mechanism for an increase in Earth mass and radius over time is based on, but not necessarily constrained to, the input of charged solar wind related electrons and protons originating from the Sun. It is envisaged that magnetically charged electrons and protons enter the Earth's magnetosphere and lower terrestrial layers primarily at the polar auroral zones and as random lightning strikes during electrical storms. These magnetically charged particles are further attracted by conduction to the strongly magnetic core-mantle region of the Earth. The elevated core-mantle temperatures and pressures present enable the particles to dissipate and recombine via nucleosynthesis as new matter within the upper core or lower mantle regions, in particular the 200 to 300 kilometres thick D" region located at the base of the mantle directly above the core-mantle boundary.

New matter formation requires not only pure energy but the presence of both electrons and protons. The combination of elevated core-mantle temperatures and the abundance of incoming charged electrons and protons within the upper core or lower mantle regions provides a viable mechanism to continuously synthesis new matter within the Earth. This new matter, in turn, represents the building blocks of all elements and mineral species present on and in the Earth and Universe today.

It is envisaged that new matter is synthesised mainly within the reactive upper core or D" region of the lower mantle which in turn results in an increase in Earth mass. This growth of new matter causes the mantle to increase in volume. This increase in volume is then transferred to the Earth's outer surface crust via two primary mechanisms. Firstly, as an increase in Earth radius and secondly, as laterally-directed crustal extension which is presently occurring on the surface of the Earth as extension along the full length of the mid-ocean-rift zones, within continental sedimentary basins, and within more localised mantle plume and igneous complex regions (Figure 5).

While brief, the outcomes of this empirical small Earth modelling and causal mechanism study are shown to more than adequately quantify the viability of modelling plate tectonic data on an increasing radius Earth model. The unique assemblage of all continental and seafloor crustal plates on small Earth models demonstrates that an increasing radius Earth, commencing during the early-Archaean, is indeed feasible. What the full range of Archaean to present-day small Earth models also demonstrate is that, rather than being a random, arbitrary, amalgamation-dispersal-amalgamation cyclical continental drift process, as we are currently led to believe, crustal development on an increasing Earth radius model is instead shown to be a simple, evolving, and predictable crustal process.

As corporate leaders, respected geoscientists, or interested persons, you therefore have the right to access this new technology and all that flows from rejecting old established concepts in order to remain innovative and competitive in your chosen field of work, study, or interest. By simply reconsidering our long established physical understanding of the Earth, the successful integration of modern global geodata into the non-conventional plate tectonic perspective presented here constitutes a paradigm shift in geoscientific understanding of the ancient Earth. The positive outcomes of this empirical scientific enquiry then prompts the need to ask the very pertinent question as to why should we not consider plate tectonics on an increasing radius Earth model?

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