

Subduction: The Extent & Duration

Neal Adams

15 West 39th Street, 9th Floor, New York, NY 10018

e-mail: neal@nealadams.com

True provable subduction, its location and extent, has been the burden and responsibility of geology since its acceptance as the answer to the spreading of the oceanic plate of Earth for the last 180 million years (as well as proposed for billions of years), of rifting and spreading. Since melted, subducted plate can't be physically measured, its extent and duration can be inferred, deduced and measured from known facts and measurable extant oceanic plate. For this we will make a clear distinction between pure factual data and conclusions drawn from this data. Areas of concern:

1. How much oceanic plate has been produced at the rifts over the last 180 million years in succeeding 10 million year segments?
2. Method (and result) of finding area of subducted plate.
3. Goal: To COMPARE the amount and duration of subduction to rift spread and added crust.

1. Introduction

In recent years, Professor Samuel Warren Carey's Expanding Earth Theory, dormant for many years, has come to life again as The Growing Earth, Growing Universe Theory. In the 60's, Professor Carey proposed that the new field of tectonics had not gone "far enough". He suggested that the true answer for "Continental Drift", was that the Earth, in some way expanded, and as a result, the crust had cracked like an eggshell, spreading the pieces apart, and that the water on the continental crust, had fallen into the spreading rifts, and 180MY later, had become the world as we see it today.

As a young science and art student, I could clearly see that this theory was correct, in spite of the contradictions presented. Researchers, Wadati and Benioff, seismically identified a descending oceanic slab above Samoa. My artistic career was just beginning, but the scientist part of my brain was shocked and appalled. I realized two things. 1. A mind that could see 3-dimensionally, could easily verify that the continents fit together perfectly. And 2. Because Professor Carey was a geologist, he could hardly be expected to provide the mechanism for growth that was needed. Expansion, could not possibly be the correct term, unless the earth was either exploding or blowing-up like a balloon, which of course, was unscientific. I felt very strongly that the answer to this multi-faceted problem existed in all the sciences. Physics in particular. I decided that with any spare time I had, I would research the problem, as deeply as necessary, in order to find a mechanism of growth. I thought perhaps it would be a 3-year study, I would write a book, and that would be it. It took 35 years, and the answer was quite incredible, and led me far afield.

In the mean time, geology had bi-passed Samuel Carey, placed him in the shadows, and regularly ridiculed his theories in geology classrooms. In my 35 years of study, the theory became far more real, and changed in nature. To come back into the fray, with the very few people who still believed, I made a series of videos that showed the growth of the Earth, the Moon, Mars, Ganymede and Europa. I have held-off on presenting the physics portion here, although the two are totally integrated and rely on one another.

The second monstrous problem was that of subduction. I tried as hard as I could to deny that subduction was valid and profound. I could not do it. I then proceeded to examine the extent and duration that subduction reduces the growing oceanic plate. Among other proofs, the one presented in this paper, is the most profound.

The Crustal Age Map, as provided by NGDC, (National Geophysical Data Center), is a masterpiece of evidence gathering by the geological community. This information gathering began in the 1960's and continues to today. Its significance is that it tells us the ages of Earth's deep oceanic, basaltic plate, taken from core samples that recorded the Earth's magnetic reversals. (When silicate rock is melted completely, it becomes new, in that it's processes begin all over. And as it cools, it is given a re-birth, going back to day one in its new existence. As the basaltic magma rose from between the spreading oceanic rifts of Earth, the clock, for this melted basalt, was reset at one. Which fixed the time of its eruption at the rifts. In support of this, Earth's magnetic reversals were permanently affixed to this new crust.) To geology's surprise, these spreading plates revealed no age older than 180MYO. The various stripes that you see, record these ages in 10MY segments. The newest, zero to 10MYO, a deep red, then red, to orange, to yellow, to green, and finally, to a deep blue, for the very oldest deep oceanic plate of 180MYO. We can easily see that the spreading of the Atlantic and the Pacific, began in the same time period, 180MYA. The rifting apart in the Atlantic, was a 2-way rift, between Eastern North America, and North Western Africa, going East and West. In the Pacific, the clearly triangular shape of the first spread, which leaves the oldest oceanic plate behind, at the very center, with no evidence of continental plate attached to it, is a 3-way split. To the West, Asia, to the East, North America, and to the South, (bottom), the Super-Continent of Australia/Antarctica.

The most significant area of the Pacific (relative to the question that we are discussing here), is this small triangular wedge of the oldest oceanic plate at the center of the Western Pacific (Fig. 2, No.180, center of triangle). This is clearly the point from which the Pacific Ocean began spreading, 180MYA. Since there is not continental plate attached to this triangle, the rifts can only

have clung to the continental plates which pulled away from the spreading triangle, by following the spreading lines, we can see the rift remains under North America, while it separated from south America 50-60MYA.

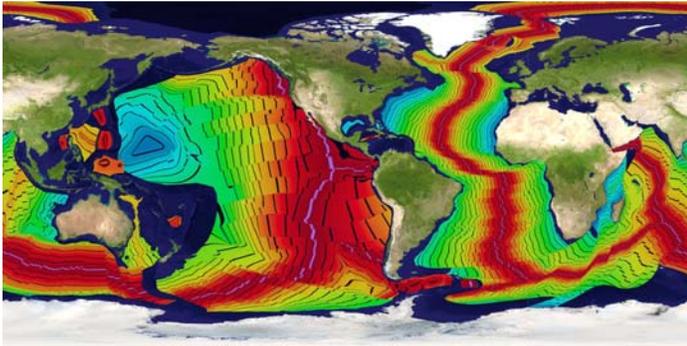


Fig. 1. Ocean Floor Age Map

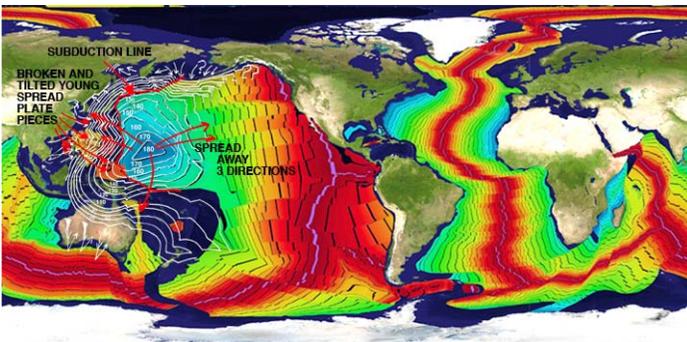


Fig. 2. Ocean Floor Age Map with Optimum Subducted Plate Indicated

Please examine "Percentage of Earth's Crust" column in Table 1 very carefully.

Age	Percentage of Earth's Crust	Square Kilometres	Square Miles
170-180MY	0.31%	1605609.34	619929.23
160-170MY	0.98%	4994197.6	1928270.48
150-160MY	1.15%	5871213.8	2266888.33
140-150MY	0.98%	4994005.52	1928196.32
130-140MY	1.78%	9077707.92	3504922.64
120-130MY	1.54%	7855300.33	3032948.43
110-120MY	2.90%	14786500.96	5709099.96
100-110MY	2.44%	12469426.75	4814472.6
90-100MY	2.47%	2592586.84	4862024.98
80-90MY	3.04%	15481374.28	5977392.05
70-80MY	3.20%	16343903.06	6310416.28
60-70MY	3.40%	17341511.2	6695594.94
50-60MY	4.03%	20532724.57	7927729.31
40-50MY	3.87%	19741176.49	7622110.89
30-40MY	4.74%	24181515.13	9336535.23
20-30MY	5.79%	29522190.99	11398581.71
10-20MY	5.62%	28661612.19	11066310.38
0-10MY	5.52%	28160719.65	10872914.69

Table 1. Table of Sea Floor Ages in increments of 10 million years [1-3]

In the Pacific A, in the Americas, South America has held to the east to "jump from the rift" 40 to 50 million years ago while North America remains on the rift. Sixty million years ago (see

Fig. 1) Australia rifted away from Antarctica. This rift circumnavigated Antarctica forcing the spread upward. (Refer to GPS measurements.) The Australian plate then had no choice except to have doubled back (upward) over its own rift 60 million years ago giving purchase to the first and only provable subduction sequence of Earth. The Ring of Fire.

The only way Australia could physically move upward is to obduct over the older plate above.

To the west, the oceanic plate twisted and shattered into massive pieces. Here was one of the most incredible geological events in Earth's history. This is all new geological plate made in the last 20, 30, 40, 50, 60 million years.

2. Subduction on the Ring of Fire

How can we use all this data and conclusions to calculate the extent and duration of subduction on the Ring of Fire? Here are some observations:

1. The remaining crust above Australia is about one to two thousand miles wide. Comparing this to the spread above Antarctica, we see Australia began back upward 60 million years ago. By drawing out... continuing the lines already on the map we can give a good approximation of where those lines must go to meet up... filling in the missing lines. Here then above and around Australia we have the greatest subduction possibility.
2. However as we come from Asia at the top... the lines compress tighter and tighter together.

Note: There is no current evidence that indicates subduction goes under 40 to 60 mile thick continental Asia, and as a reminder we are dealing only with known factual information, not speculation or conjecture.

We also see shards of broken 30, 40, 50 million year old oceanic plate there and whole... before it was shattered. So now we also know when it was complete new and spreading. That would be about 50 million years ago, and at that location!

We can see, therefore, that subduction, not only didn't go under Asia, but it had no need to go under Asia.

All of this is clear in Fig. 2.

3. Conclusion

1. Review of all this data and every possible piece of information available is entered into all aspects of this map. This is the maximum distance this oceanic plate can subduct. The subducted area is far less than 1/20 of the spread area.
2. Review of all data and every possible measurement and projection indicates clearly that subduction of the Ring of Fire began above the Australian plate at approximately 60 million years ago. There is no indication of subduction, on this map, anywhere in the world before 60 million years ago.
3. If we assume irregularities in areas uncalculated (A. North Pole B. East of Australia. C. And any continental plate spreading (Europe/Mediterranean)), then increasing growth was upward until 60 million years ago. Between 60 million years ago and 50 million years ago a small lack of exponential increase is seen, as well as the last 10 million years. Ignoring these minor irregularities, please note an increase of surface

area EQUAL to the AREA OF AFRICA has occurred in each of the last 10 million year segments.

References

- [1] Earth Byte, "Age and Bathymetry of the World's Ocean Crust for the Last 140 Million Years", <http://www.earthbyte.org/References/palaeoagegrid2008.html>.
- [2] USYD Geoscience Data Resources, "Age Grid Analysis" http://www.geosci.usyd.edu.au/research/marinegeophysics/Res/projects/Agegrid/digit_isochrons.html.
- [3] Software Development by Vorlath, "The Scientific Method, <http://my.opera.com/Vorlath/blog/2009/12/21/the-scientific-method>.

Further Resources

- [1] C. J. O'Neill, R. D. Mueller, B. Steinberger, *Geochemistry, Geophysics, Geosystems* **6**, doi:10.1029/2004GC000784 (2005).
- [2] R. D. Müller, J.-Y. Royer, L. A. Lawver, *Geology* **21**, 275 (1993).
- [3] R. D. Müller, S. C. Cande, J.-Y. Royer, W. R. Roest, S. Maschenkov, in *Caribbean Basins* P. Mann, Ed. (Elsevier, Amsterdam, 1999), vol. 4, pp. 39-55.
- [4] R. D. Müller, W. R. Roest, *Journal of Geophysical Research* **97**, 3337 (1992).
- [5] R. D. Müller, W. R. Roest, J.-Y. Royer, L. M. Gahagan, J. G. Sclater, *Journal of Geophysical Research* **102**: 3211 (1997).
- [6] K. Klitgord, H. Schouten, in P. R. Vogt, B. E. Tucholke, Eds., **The Western North Atlantic Region, DNAG**, vol. M, pp. 351-378 (Geol. Soc. Am., Boulder, CO, United States, 1986).
- [7] C. Gaina, W. R. Roest, R. D. Müller, *Earth and Planetary Science Letters* **197**: 273 (15 Apr 2002).
- [8] C. Gaina, T. H. Torsvik, L. Gernigon, P. J. Ball, presented at the *European Geoscience Union Meeting* (Vienna 2007).
- [9] L. A. Lawver, R. D. Müller, S. P. Srivastava, W. Roest, in U. Bleil, J. Thiede, Eds., **Geological History of the Polar Oceans: Arctic Versus Antarctic**, NATO Science Series, pp. 29-62 (Springer, 1990).
- [10] S. P. Srivastava, W. R. Roest. (Atlantic Geoscience Centre, Geologic Survey of Canada, Map sheets L17-2 - L17-6, 1989).
- [11] D. Nürnberg, R. D. Müller, *Tectonophysics* **191**: 27 (1991).
- [12] J.-Y. Royer, T. Chang, *Journal of Geophysical Research* **96**: 11779 (1991).
- [13] C. Gaina, R. D. Müller, B. Brown, T. Ishihara, in H. R.R., M. R.D., Eds., **Evolution and Dynamics of the Australian Plate**, pp. 405-416 (Geological Society of Australia Special Publication 22 and Geological Society of America Special Paper 372, 2003).
- [14] C. Heine, R. D. Müller, C. Gaina, in P. D. Clift, D. E. Hayes, W. Kuhnt, P. Wang, Eds., **Continent-Ocean Interactions within East Asian Marginal Seas**, Geophysical Monograph, vol. 149, pp. 37-54 (American Geophysical Union, Washington, 2004).
- [15] R. D. Müller et al, in M. A. Richards, R. G. Gordon, R. D. van der Hilst, Eds., **The History and Dynamics of Global Plate Motions**, Geophysical Monograph, vol. 121, pp. 161-188 (American Geophysical Union, Washington, DC, 2000).
- [16] J. R. Curray et al, in J. S. Watkins, J. Montadert, P. W. Dickerson, Eds., **Geological and Geophysical Investigations of Continental Margins**, vol. 29, pp. 189-198 (American Association Petroleum Geologists, Tulsa, Oklahoma, 1979).
- [17] T.-Y. Lee, L. A. Lawver, *Tectonophysics* **251**: 85 (1995).
- [18] A. Bernard, M. Munsch, Y. Rotstein, D. Sauter, *Geophysical Journal International* **162**, 765 (2005).
- [19] A. P. Nankivell, University of Oxford (1998).
- [20] K. M. Marks, A. A. Tikku, *Earth & Planetary Science Letters* **186**: 479 (2001).
- [21] S. C. Cande, J. M. Stock, *Geophysical Journal International* **157**: 399 (Apr, 2004).
- [22] S. C. Cande, J. M. Stock, R. D. Müller, T. Ishihara, *Nature* **404**: 145 (2000).
- [23] S. C. Cande, C. A. Raymond, J. Stock, W. F. Haxby, *Science* **270**: 947 (1995).
- [24] R. D. Larter, A. P. Cunningham, P. F. Barker, K. Gohl, F. O. Nitsche, *Journal of Geophysical Research-Solid Earth* **107**: 2345 (13 Dec 2002).