Sediment cycling on continental and oceanic crust
Geology 45:323-326

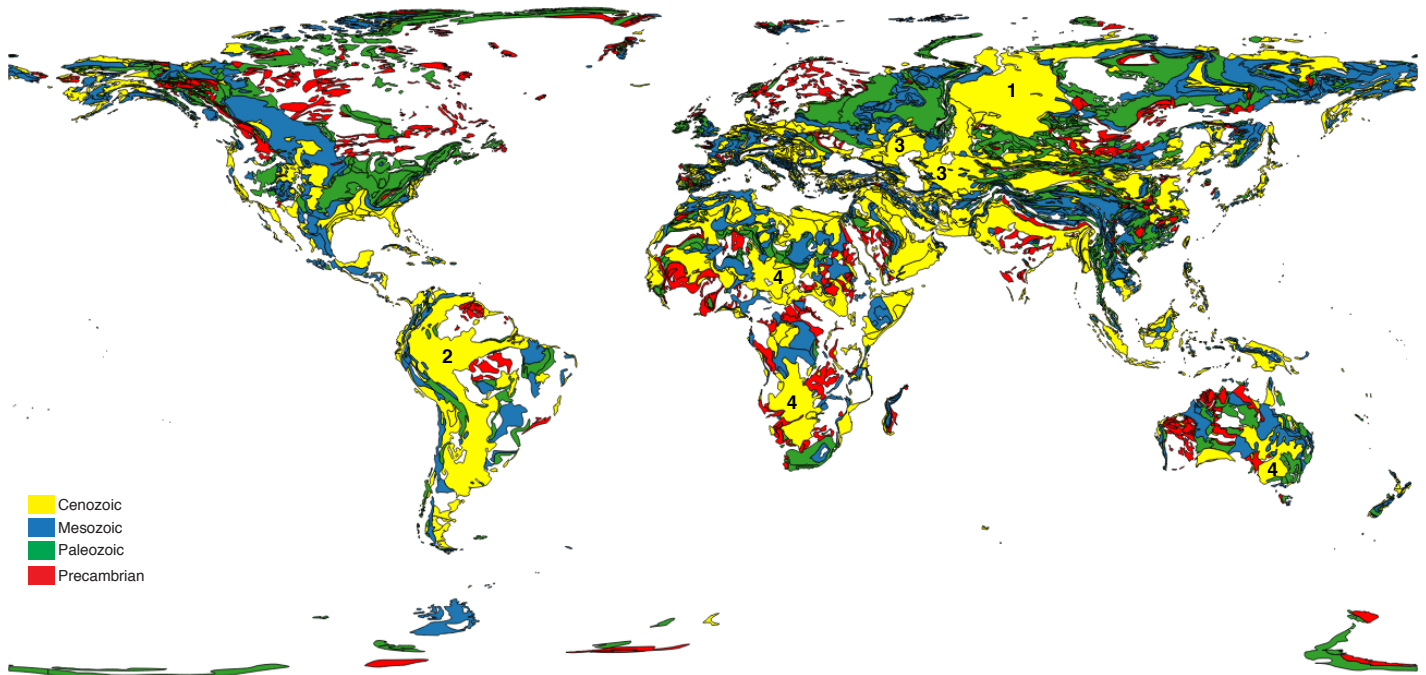Shanan E. Peters and Jon M. Husson

Fig. S1. Global geological map (https://mrdata.usgs.gov/geology/world) showing only polygons mapped as sedimentary/metasedimentary. Polygons are colored by era in Phanerozoic. Precambrian polygons are red. The four groups of polygons shown in main text Fig. 3 (circles) are numbered 1 through 4 in the map above.

All of the Cenozoic decrease in geologic map area of sediment in the global map (Fig. 3) can be accounted for by on the 7 orange out of 4,540 total sedimentary polygons. The effects of sequentially subtracting these polygons from global sediment map area in the last time interval (1 Ma) are shown by the circular points in Fig. 3. The West Siberian Basin (labeled 1), one of the largest sedimentary basins in the world, is represented on the global geologic map by one polygon covering 2.5×10^6 km^2, labeled "Quaternary sedimentary rocks." However, these sediments are the most recent addition to a 2-11+ km thick succession of flat-lying Cenozoic and Mesozoic sediments that cover deformed Paleozoic accreted terranes/sediments and Siberian Trap volcanics (Cherepanova et al. 2013). Similarly, the majority of the Andean retroarc foreland basin and Amazon drainage area is represented as a single 5.4×10^6 km^2 region labeled "Quaternary sedimentary rock" (labeled 2), most of which are recent additions to a thick succession of older sediments. In the Caspian Sea region, there are two polygons titled "Quaternary sedimentary rocks" (labeled 3) that cover 1.8×10^6 km^2. These, too, bury and preserve primarily Phanerozoic-aged sediment. Finally, three late Cenozoic polygons from Australia and Africa (labeled 4) represent regolith and recently deposited, non-marine sediments. Together, they span an additional 3.8×10^6 km^2, most of which is underlain by Proterozoic crystalline basement and sediments.

Cherepanova, Y., Artemieva, I. M., Thybo, H., and Chemia, Z., 2013, Crustal structure of the Siberian craton and the West Siberian basin: An appraisal of existing seismic data: Tectonophysics, v. 609, p. 154–183.
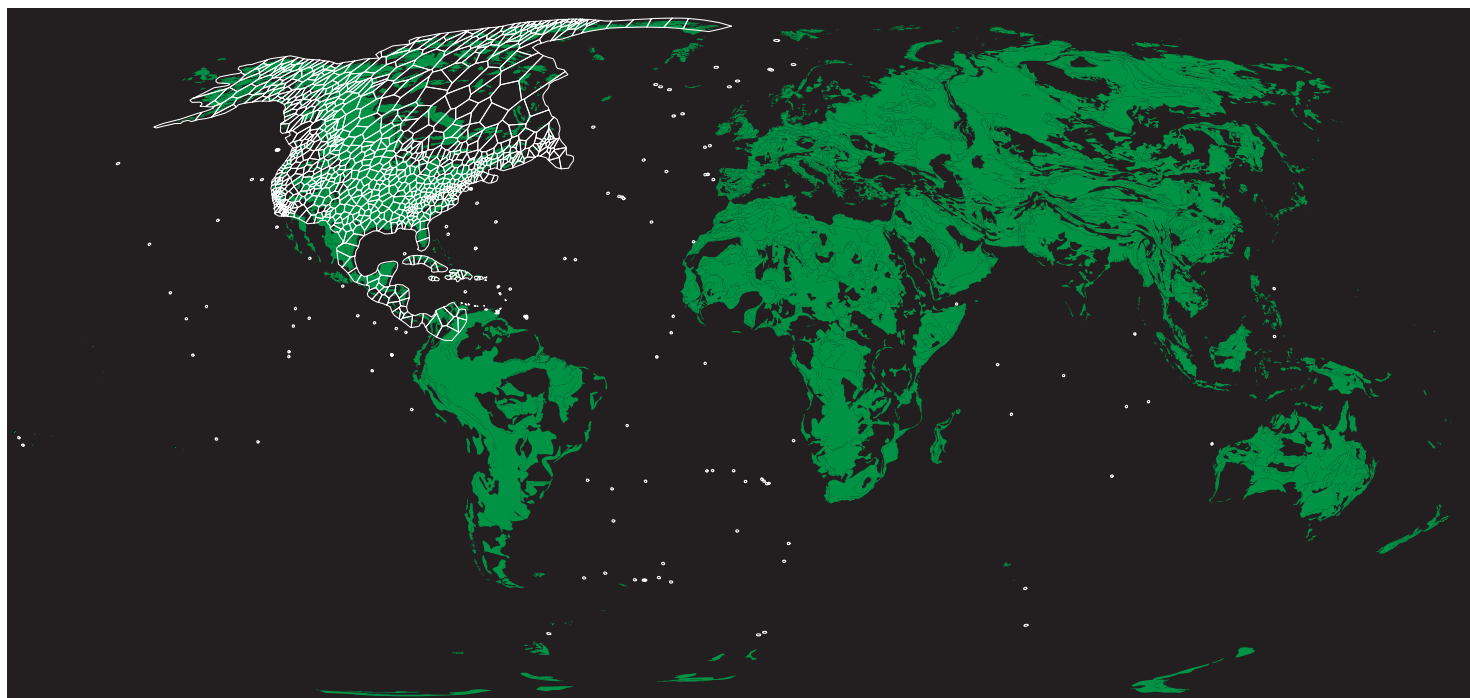
Fig. S2. Global sediment coverage, as in Fig. S1 but, not colored by age for clarity. Macrostrat column polygons in North/Central America and the Caribbean also shown, as in Fig. S1, but in white to enhance clarity. Deep sea drilling sites used here shown by white dots (see Fraass et al. 2015).
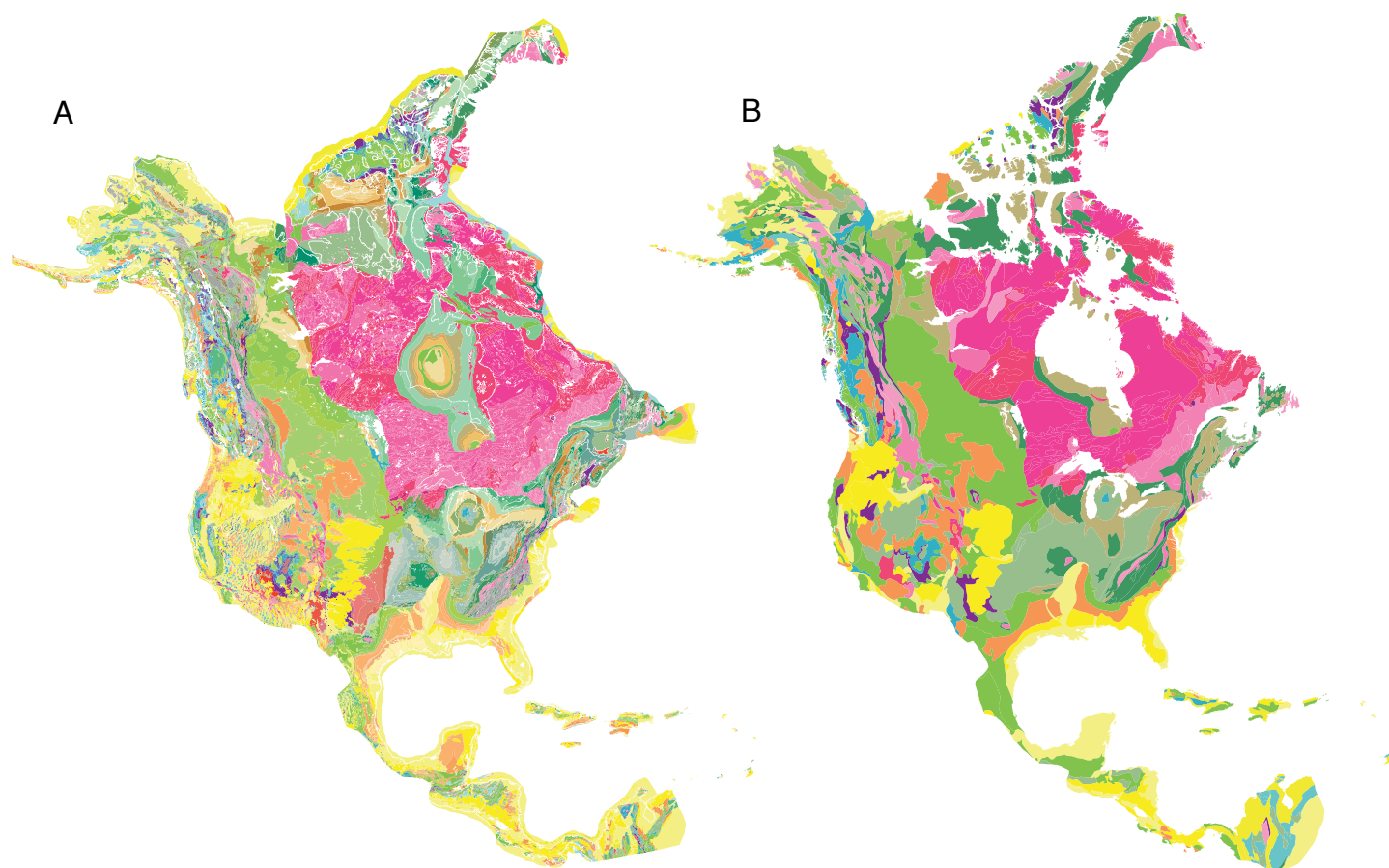
A

B

Fig. S3. Geologic maps clipped to the continental coverage area of Macrostrat (Fig. S1 and S2). A) GMNA, 2) Global geological map (as in Fig. 1), which does not included submerged areas. All mapped polygons, which include igneous and metamorphic non-sedimentary rock, are shown here.
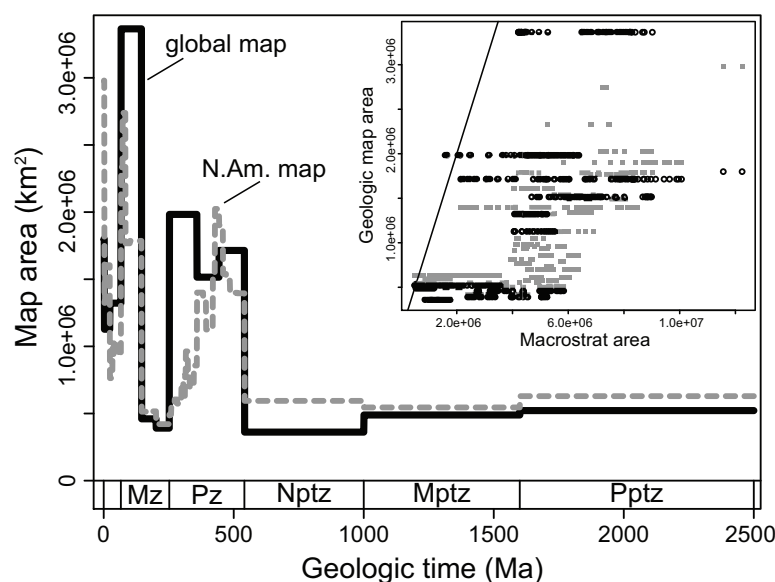
Fig. S4. Total sediment and metasdiment map area in the GMNA and global geological map clipped to area of Macrostrat (as in Fig. S3). Inset shows relationship between map area and the Macrostrat-based estimate of sediment area. The 1:1 line is also shown. Macrostrat is correlated with map-based estimates but it includes subsurface data, making the average coverage area in Macrostrat approximately 3x greater than the map-based estimates. The divergence between Macrostrat area and map-based area increases in magnitude towards the recent, reflecting the effect of burial and the inclusion of young, non-marine sediments.

SI Datasets. All Macrostrat column data are accessible online via the Macrostrat API. Basic documentation for the API is available at https://macrostrat.org/api/sections and https://macrostrat.org/columns. The specific API calls here used to obtain data, which are returned in JSON format:

Columns and spatial coverage :
Continental polygons: https://macrostrat.org/api/columns?project_id=1,7
Deep sea: https://macrostrat.org/api/columns?project_id=4

All sediments:
https://macrostrat.org/api/v2/sections?lith_class=sedimentary&lith_type=metasedimentary&project_id=1,7&response=long

Non-marine sediments:
https://macrostrat.org/api/v2/sections?environ_class=non-marine&lith_class=sedimentary&lith_type=metasedimentary&project_id=1,7&response=long

Marine sediments:
https://macrostrat.org/api/v2/sections?environ_class=marine&lith_class=sedimentary&lith_type=metasedimentary&project_id=1,7&response=long

Deep sea sediments:
https://macrostrat.org/api/v2/sections?lith_class=sedimentary&lith_type=metasedimentary&project_id=4&response=long

Output from these data service calls contains all of the data necessary to describe the area, thickness, ages and lithologies of sediments and metasediments, as well as additional information such as column sources, fossil occurrences and other rock unit attributes. For convenience, the attached supplemental table contains the time series used to generate main figures. Reported are number columns with sediment of given age. 1013 columns are present for non-marine and marine sed, 132 for deep sea (refer to locations in Fig. S2).

Data for the geological map-based analyses conducted here are available from the original sources cited in the main text. If interested readers have trouble accessing and processing these published ArcGIS files, they may contact the authors for delimited text files suitable to reproduce these analyses.