# Geological, archaeological, meteorological and astrophysical data portend imminent global multi-metre sea-level rise by combined solar-driven and man-made warming

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Worldwide geological and archaeological benchmarks of former sea level (SL) reveal a post-50AD/pre-600AD (loosely C14-dated) SL rise, variously interpreted as 1 to 3m, reaching ~1m above today's SL. This is the 'Rottnest' transgression on the 'Fairbridge curve' of oscillating Holocene SL (dismissed by IPCC). The Rottnest has many other local names, e.g. Romano-British (copious UK archaeological evidence reviewed by Cracknell 2005), Dunkirk II (Belgium), Gilbert V (Pacific), St Firmin (France), Wulfert (USA). Exquisitely dated (by Roman coins, ceramics, dendro) evidence constrains the Rottnest to *~350-450AD*, including: 1) severe Thames-estuary-side erosion of Londinium's *~270AD* city wall; 2) a drain-tunnel through the wall, deliberately plugged with *post-320/pre-400AD* pottery and tile, "possibly to prevent water flowing in behind the Wall as the river level rose" (Willcox in Hill et al. 1980). Brigham (1990) countered "the river level could hardly have risen almost 2m in half a century", but Blanchon (2009) proved 2-3m SL rise in decades in the previous interglacial, MIS5e; 3) the *410-450AD* main exodus to Britain of Anglo-Saxons, evacuating their NW European coastal 'terpen' man-made mud-mound villages.

Only ice-sheet collapse by warming can explain such rapid metre-scale global transgressions (Blanchon). Indeed, in Rottnest time, Greenland warmed 0.9°C in only ~40y, 370 to 410AD, then cooled 1.8°C in 60y (Agassiz-Renland ice-core proxy, Vinther

et al. 2009). This 410AD hot peak, proven pan-Arctic (McKay and Kaufman 2014 fig2d), was unsurpassed until after 2000AD (below); it is not seen in Antarctic ice cores.

Both McKay's and Vinther's temperature graphs (1-2000AD, 9700BC-1980AD) closely mimic solar-magnetic output (e.g. Wu et al. 2018 graph), supporting Svensmark's theory (dismissed by IPCC). Simple graph-to-graph visual comparison shows that major peaks and troughs cross-match, revealing a 100-200y temperature lag, e.g. 1) the 450y-long Little Ice Age cluster of solar- and temperature minima is clearly offset 200y (1260-1710AD vs 1460-1910); 2) Vinther's 410AD superpeak (above) matches a 310 solar superpeak, unsurpassed until the late 1900s (below); and 3) his *slightly* cooler (by 0.1°C) peak of 1950 (1940-60 average), corresponding to 1930-50 warmth on Greenland coastal thermometer charts (NASA-GISS homogenized data), matches the *slightly* weaker solar peak of 1785 (i.e. time-lag ~165y).

On these same coastal charts (which strongly match supra-ice-sheet GISP2 thermometer chart, recorded from 1988), smoothed 2005-2022 temperatures are ~0.5°C warmer than 1930-1950 (see also Kobashi et al. 2017 fig1b), i.e. ~0.4°C warmer than 410AD (Rottnest), i.e. Greenland's ice-collapse threshold is likely re-breached. This 2005-2022 Greenland (and global) extra warmth is presumably anthropogenic, as the corresponding (time-lagged) solar output was less than for the 1930-50 warm period.

SL is now rising only ~3mm/y and acceleration since 1800 is trivial (Jevrejeva et al. 2014), i.e. ice collapse has not yet begun (but note reported Greenland-Antarctic glacier acceleration). A 2m SL rise in the next 100y (cf. Rottnest; contrast IPCC worst-case 1m by 2100) would require the rate to jump very soon (<20y?) to 2cm/y or more. However, unlike the RBT, with its intrinsic end-mechanism (cooling by solar decline, above), anthropogenic warming has no foreseeable end, so the coming SL rise might exceed 5m. Worse, the 1901-1991 exceptional 130% solar-magnetic surge, to its highest value in >2,000y (exceeding Rottnest), portends strong additional warming from ~2065 (1901 plus ~165y lag).