Continental Margins: Crust in Jeopardy

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Re: contimental crust "A hypothesis that is widely accepted is a two stage origin. [Mantle-derived basalts] undergo [medium pressure] intracrustal differentiation, creating silicic upper crust and mafic lower crust. The lower crust is then recycled into the mantle by delamination." Schubert et al. (2001). This foundering process, as well as subduction-erosion and slab breakoff, are driven by a density instability, commonly attributed to a transformation of basalt to eclogitic at the base of contractionally overthickened crust. To be "important", the candidate processes must operate at rates on the order of an AU (km3/yr=Armstrong Unit), which is on the order as basalt production rate at arcs. As delamination is an event of short duration, it is not observed (imaged seismically) in many places at present: the Sierras and the central Andean plateau are examples. It is thought not to occur at oceanic arcs, due to the thinner crust, although the arc migration and uncommon adakitic magmatism allows for the operation of subduction-erosion, as in the Aleutian arc. The identification of delamination events in the past, either while convergent margins are active or when the contractional event is a continental collision, relies on proper interpretation of the distinctive magmatism (often "adakitic") structural events and thermal events (including magnatic flareups), the latter being orogenic events. Examples are at once much commoner that present-day ones, but also more speculative. In particular, some diagnostic parts of the continental margin are often missing, due to low preservation. Finally, over Earth history as much recycling as accretion has occurred.