Devonian glaciation In Gondwana and its global effects

[1]ISAACSON, P.E., [2]HLADIL, J., [3]DIAZ-MARTINEZ, E., [4]SHEN, J. and [2]GRADER, G., [1]Univ Idaho, Moscow, USA; [2]ASCR, Praha, Czech Rep; [3]CSIC-UCM, Madrid Spain; [4]Univ Queensland, Australia

Late Devonian (Famennian) initiation of Gondwana's glaciations is well-established, with thick diamictite-dropstone deposition, striated polymict clasts, and glacial pavements, from Bolivia through the Solimões, Amazonas and Parnaíba basins of Brazil. There is a possibility that it extended into Africa (Central African Republic and South Africa?). The glacial depositional record in Gondwana may represent the waning Devonian ice and is accompanied by mid(?)-high latitude phytogeographic provincialism and a progressive change from marine to terrestrial palynomorphs. Global response to the glaciation occurred within an expanded Famennian time scale (10my). It appears that sudden and episodic marine drawdown caused some synchronous global events, including lacunae and black shales. We suggest that black shales represent orogenic highland nutrients supplied to progressively silled basins, causing eutrophication. In North America there also occurred phreatic zone breccias in suddenly exhumed Frasnian carbonate banks, as well as evaporites and ephemeral sedimentary units with recycled fossils from earlier strata. There are craton-sourced sheet sands, suggesting subaerial exposure. Along the South Laurussian margin, in Moravia, exhumed carbonate banks are synchronous with tectonically-active seamounts, on which occurred calcturbidites and other rocks unaffected by lowstands. Central and coastal parts of carbonate platforms characteristically have significant breaks, paleokarst, and diagenetic brecciation in their Famennian and Tournaisian sedimentary successions. A unique occurrence of Famennian microbially-dominated organic buildups in Guangxhi and Guilin, China, suggests a significant change in ocean chemistry. Also are dolomitized subaerial desiccation-fill with phosphatic and/or ferricrusts and karst surfaces.