Geophysical Research Abstracts,
Vol. 10, EGU2008-A-08994, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-08994
EGU General Assembly 2008

Denudation and uplift across the Ghana transform margin as indicated by new apatite fission track data

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The Côte d'Ivoire-Ghana continental margin represents the central segment of the world's largest and most prominent transform margin. Its morphotectonic evolution has been investigated during the last decade primarily by means of geophysical and structural analyses and apatite fission track data from ODP drill holes, and thermo-mechanical modelling. Thereby, Cretaceous fission track ages with a broad spread of fission track length data obtained from Cretaceous offshore strata were interpreted in terms of either episodes of fast cooling following heating by friction/ hydrothermalism and/or in situ sedimentary burial, or of Early Cretaceous rapid cooling related to erosion of the sediment source. We present new apatite fission track data from basement samples from southern Ghana, with ages ranging from 130 to 415 Ma. Quantitative thermal history modelling indicates two stages of moderate cooling/ denudation in southern Ghana during Palaeozoic times, and in the Cretaceous. The later cooling stage commencing at ˜130 Ma refers to up to 5 km of basement denudation related to initial continental rifting, and implies only minor Cenozoic denudation. The synchronicity of basement cooling, rift sedimentation and basin deposition offshore favours the concept of hydrothermal circulation within an intracontinental fault acting between African and Brazilian basements. The new thermochronological data have major consequences for our understanding of transform margin evolution, in particular with respect to the relation of uplift and denudation during rifting and transform stages, the effect of thermal uplift on sheared margins, and to the heat flow within the newly formed basins.