AGU FALL MEETING
San Francisco | 12–16 December 2016

T23F-04: New Insights into the Origin of the Bering Sea from SO201 and SO249 cruises (Invited)

Tuesday, 13 December 2016
14:25 - 14:40
Moscone South - 308

The origin of the Bering Sea Basin remains elusive. It is still not resolved if the basin formed by plate capture or backarc spreading. On the German R/V Sonne cruises SO201/1b-2 KALMAR in 2009 and SO249/1-2 BERING in 2016, combined with fieldwork on the Komandorsky Islands, our studies of the southern (Aleutian) and western (Kamchatka to Chukotka) margins of the Bering Sea and of the Bowers and Shirshov Ridges have provided new insights into the complex origin of the Bering marginal basin. Recent work shows that the Bowers Ridge and adjacent Bowers Basin were an active arc-backarc system in Early Oligocene to Early Miocene and were located behind the Aleutian Island Arc, also active during this time period (e.g. Wanke et al., 2013, Geology). We interpret the line of basement blocks connecting the Bowers and Shirshov Ridges to be uplifted blocks along a former strike-slip fault. NE-oriented fossil spreading centers and associated NW-oriented fracture zones in the Komandorsky Basin suggest that the Shirshov Ridge underwent counter-clockwise rotation away from the NE-trending margin of northern Kamchatka (Baranov et al., 1991, Tectonophysics). We propose that similar to the Bowers Ridge subduction beneath the eastern margin of the Shirshov Ridge in Oligocene-Miocene time also created the Komandorsky Basin by backarc spreading. The possible presence of obducted oceanic crust on the Shirshov Ridge, consistent with dredging results (Silantyev et al. 1985-86, Geochem. Int.), may explain the absence of gravity and seismic profiles characteristic of a remnant island arc, as seen on the Bowers Ridge. To explain the initiation of subduction beneath the Bowers and Shirshov Ridges in this model, seafloor underlying the main Bering Sea deep-water basin must have been relatively old in the late Paleogene. Thus, this model favors a plate capture scenario for formation of the eastern part of the Bering seafloor.

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