CONTROL ID: 1460728 **TITLE:** First Geochemical Evidences for Existence of Slow-Spreading Ridges in the Pacific Ocean **AUTHORS (FIRST NAME, LAST NAME):** Elizaveta Andreevna Krasnova[1], Maxim Portnyagin[1, 2], Sergey Silantyev[1], Reinhard Werner[2], Kaj Hoernle[2] **INSTITUTIONS (ALL):** 1. Sobolev AV laboratory, Vernadsky Institute RAS, Moscow, Russian Federation.
2. Helmholtz Centre for Ocean Research Kiel (GEOMAR), Kiel, Germany.
ABSTRACT BODY: Stalemate Fracture Zone (SFZ) is a 500 km long SE-NW trending transverse ridge between the northernmost Emperor Seamounts and the Aleutian Trench which originated by flexural uplift of Cretaceous (?) oceanic lithosphere along a transform fault at the Kula-Pacific plate boundary [1]. Sampling at the SFZ and the fossil Kula-Pacific Rift valley was carried out during the R/V SONNE cruise SO201 Leg 1b in July 2009. These rocks are thought to represent a complete section of oceanic lithosphere formed at the fossil Kula-Pacific Spreading Center.
A broad spectrum of mantle peridotites ranging from spinel lherzolites to dunites were dredged at station DR37 at the northern bend of SFZ. Spinel in lherzolites has Mg#=0.65-0.68, NiO=0.26-0.34 wt%, Cr#=0.26-0.33, Fe3+#=0.021-0.030 and TiO2=0.04-0.09 wt%. Clinopyroxene has Mg#=91.7-92.4, Cr#=0.12-0.16, TiO2=0.06- 0.15 wt%, Na2O=0.19-0.41 wt%, NiO=0.06-0.09 wt% and is moderately depleted in HREE and extremely depleted in MREE and Zr (C1-normalized YbN=4.0- 5.6, [Sm/Yb]N=0.05-0.14, [Zr/Y]N=0.001-0.009) [2,3]. In terms of spinel and clinopyroxene Cr# and absolute concentrations of HREE, Ti and Na, these compositions are less depleted than those from the Hess Deep peridotites [4] formed at the fast spreading East-Pacific Rise. The SFZ peridotites are more similar to abyssal peridotites from slow-spreading ridges [e.g., 5]. Geochemical modeling suggests that the SFZ peridotites can be formed by 10-12% of near-fractional partial melting of depleted MORB mantle.
We used the correlation between degree of partial mantle melting and full spreading rate [6] to estimate the spreading rate of 4-5 cm/year at the formation of the SFZ residual lherzolites (Fig.1). These results agree well with paleomagnetic data [1] suggesting asymmetric spreading at the ancient Kula-Pacific Center with the full rate of ~6 cm/year. Thus both geochemical and paleomagnetic data suggest the existence of slow-spreading ridges in the Pacific Basin during the Old Cretaceous-Paleogene time.

[1] Lonsdale (1988) GSA Bulletin 100, 733-754.
[2] Krasnova et al, Geochemistry Inter., in press.
[3] Silantyev et al (2012) Petrology 20,2, 1-20.
[4] Dick & Natland (1996) Proc. Ocean Drill. Program: Sci. Results 147, 103-134.
[5] Dick & Bullen (1984) Contrib. Mineral. Petrol. 86, 54-76.
[6] Bazilev & Silantyev (2000) Petrology, 8,3, 227-240.

KEYWORDS: [3035] MARINE GEOLOGY AND GEOPHYSICS / Midocean ridge processes, [1038] GEOCHEMISTRY / Mantle processes, [3619] MINERALOGY AND PETROLOGY / Magma genesis and partial melting, [4200] OCEANOGRAPHY: GENERAL. 1460728_File000000.jpg ¬
The correlation between Spinel Cr-number and full spreading rate (after Bazilev & Silantyev 2000). Large circle denotes average composition of spinel from SFZ lherzolites.

(No Table Selected)
Additional Details Previously Presented Material:
Contact Details CONTACT (NAME ONLY): Elizaveta Krasnova **CONTACT (E-MAIL ONLY):** eakrasnova@gmail.com **TITLE OF TEAM:**