Geophysical Research Abstracts,
Vol. 11, EGU2009-2768, 2009
EGU General Assembly 2009

"Storm Alley" on Saturn and "Roaring Forties" on Earth: two bright phenomena of the same origin

G. G. Kochemasov
IGEM, RAS, Moscow, Russian Federation (kochem.36@mail.ru, +7 095 230-2179)

“Storm Alley” on Saturn and “Roaring Forties’ on Earth: two bright phenomena of the same origin.

G. Kochemasov

IGEM of the Russian Academy of Sciences, Moscow, Russia, kochem.36@mail.ru

Persisting swirling storms around 35 parallel of the southern latitude in the Saturnian atmosphere and famous “Roaring Forties” of the terrestrial hydro- and atmosphere are two bright phenomena that should be explained by the same physical law. The saturnian “Storm Alley” (as it is called by the Cassini scientists) is a stable feature observed also by “Voyager”. The Earth’s “Roaring Forties” are well known to navigators from very remote times. The wave planetology [1-3 & others] explains this similarity by a fact that both atmospheres belong to rotating globular planets. This means that the tropic and extra-tropic belts of these bodies have differing angular momenta. Belonging to one body these belts, naturally, tend to equilibrate their angular momenta mainly by redistribution of masses and densities [4]. But a perfect equilibration is impossible as long as a rotating body (Saturn or Earth or any other) keeps its globular shape due to mighty gravity. So, a contradiction of tropics and extra-tropics will be forever and the zone mainly between 30 to 50 degrees in both hemispheres always will be a zone of friction, turbulence and strong winds. Some echoes of these events will be felt farther poleward up to 70 degrees. On Earth the Roaring Forties (40˚-50˚) have a continuation in Furious Fifties (50˚-60˚) and Shrieking (Screaming) Sixties (below 60˚, close to Antarctica). Below are some examples of excited atmosphere of Saturn imaged by Cassini. PIA09734 – storms within 46˚ south; PIA09778 – monitoring the Maelstrom, 44˚ north; PIA09787 – northern storms, 59˚ north; PIA09796 – cloud details, 44˚ north; PIA10413 – storms of the high north, 70˚ north; PIA10411 – swirling storms, “Storm Alley”, 35˚ south; PIA10457 – keep it rolling, “Storm Alley”, 35˚ south; PIA10439 – dance of the clouds, 47˚ south; PIA10437 – dual vortices, 33˚ north.
In the Earth’s case the turbulence touches the atmosphere, oceans and lithosphere. Navigators for sailing use strong westerly winds in Roaring Forties. Europe is often hit by anomalous, sometimes disasters weather conditions (though winds in the northern hemisphere are somehow softened by landmasses). In the crust of Eurasia, North America and in the Southern ocean along latitudes 46˚-48˚ there are two latitudinal geomorphologic planetary flexures marking transition of subsiding inward belts to uplifting outward (pole ward) belts [5]. These slow secular crust and lithosphere movements of opposite signs witness the tendency of rotating Earth to equilibrate angular momenta of its tropic and extra-tropic belts. Thus, both planets – the rocky sphere and the gaseous giant globe – obey the same fundamental law of nature and try to adjust uneven angular momenta of its tropic and extra-tropic belts marking transition between them by anomalous features.
References: [1] Kochemasov G.G. Concerted wave supergranulation of the solar system bodies // 16th Russian-American microsymposium on planetology, Abstracts, Moscow, Vernadsky Inst. (GEOKHI), 1992, 36-37. [2] Kochemasov G.G. Tectonic dichotomy, sectoring and granulation of Earth and other celestial bodies // Proceedings of the International Symposium on New Concepts in Global Tectonics, “NCGT-98 TSUKUBA”, Geological Survey of Japan, Tsukuba, Nov 20-23, 1998, p. 144-147. [3] Kochemasov G.G. Theorems of wave planetary tectonics // Geophys. Res. Abstr., 1999, V.1, №3, 700. [4] Kochemasov G.G. Tectonics of rotating celestial globes // Vernadsky-Brown microsymposium 48, 20-22 Oct. 2008, Moscow, Abstr. m48_20. [5] Kotov F. S. A reflection of planetary flexures in limits of the continental lithosphere // Tectonics and geodynamics of the continental

lithosphere. Proceedings of the XXXVI Tectonic conference. T. I, 4-6 Febr. 2003, Ed. Yu.V. Karyakin, Moscow, GEOS, 2003, 370 pp (p. 305-308) (In Russian).