



The cometary-asteroidal hypothesis for the 1908 Tunguska event is untenable

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Introduction

It is suggested that an explosion in the Tunguska Basin ($\sim 101^\circ\text{E}, \sim 60^\circ\text{N}$) at 7:15 a.m. on June 30, 1908, resulted from a comet or asteroid disruption. However, there is no consensus whether this was so. Furthermore, despite the prevailing opinion about their similarity, the 1908 Tunguska event was fundamentally different from the 2013 Chelyabinsk meteorite fall [1].

Polarization effect

The growth of neutral polarization points, which began in May 1907, continued until the Tunguska explosion when the maximum relative increase in polarization was recorded for the entire 1905-1909 period [2]. However, only after the explosion did polarization violations reach heights of 50-100 km [3]. This meant the polarization effect 'spread' from the lower to the upper atmosphere, and not vice versa, as would be expected in the case of the penetration of comet matter.

Preceding airglows

Before the Tunguska explosion on June 30, the appearance of luminous clouds over Europa on April 30, 1908 [4], May 27, 1908 [5], and more powerful since June 23, 1908 [6], was consistent with the 27-day synodic/Carrington solar rotation period. This allows us to assert correlations of clouds with solar magnetic fields and plasma flows. For asteroids and inactive comets, such preceding airglows are impossible. In the case of an active comet with tails, astronomers would notice her in advance. Since the airglows of the Tunguska event were also observed in the cone of the Earth's shadow [7], they could not be caused by the sunlight scattering on ice particles, including noctilucent clouds NLCs, formed after the comet/asteroid explosion.

Geomagnetic declination pulsations in Kiel

The Tunguska event was likely dependent on physical processes associated with the solar eclipse on June 28, 1908. This was indicated by the geomagnetic Pc5 pulsations in Kiel on June 27-30, 1908 [8], which were almost symmetrical with respect to the eclipse time. They began three days before the explosion on June 30, 1908, and ended ~ 15 min after it, which leaves no doubt about the correlation with the Tunguska event. Since huge solar spots/eruptions were observed 27-30 June, the 3-min pulsations' period in Kiel could be caused by resonance with the 'acoustic halo' of Sun's global earthquakes, having a 5-7 milliHz frequency, i.e. 3-min period [9]. Resonance with them on the Earth arises due to the effect of the Sun's interplanetary field (IMF) on the geomagnetic field [10].

The beginning of the registrations in Kiel in the first two days (June 27 and 28, 1908) at 18:00 local time (LT) coincided with both the local peak of the IMF's uncompensated tangential component [11] and the maximum density of solar wind plasma in the Earth's plasmasphere [12]. The thermal diurnal tide (S1) also reaches its maximum at 18:00 LT [13]. Moreover, at different times and in various regions of the Earth [14], earthquakes, including those distant from the places of registration, occurred, starting at 18:00 LT, and the registration of precursors of these earthquakes in the form of seismic and ionospheric disturbances had, as in Kiel, for the 5-7.5 hours duration. The type of seismogram recorded in Irkutsk on June 30, 1908, confirms the recording of a tectonic-volcanic earthquake. In addition, the 1908 nitrate peak in Greenland was associated with solar activity due to the presence of ammonium [15].

The multi-activity of the paleovolcano

Found on the Tunguska area, silicate-iron spherules differ in magnesium, calcium, and aluminium oxides from all known large meteor flow, iron-stone, and stone meteorites. The ratio of iridium and carbon anomalies is four orders of magnitude distinct from known in asteroids/comets [16]. No traces of the chondrite fraction of the alleged comet were found [17]. The composition of chemical elements in the trees' resin [18] refers to volcanic aerosols. An underground fire, which had a ~600°C temperature and spotting in the epicentre, corresponded to the outlet of underground gas [16]. The trees' destruction indicated ground burst, but not an airburst because in not shielded, open places remained unaffected entire groves, whose age exceeded 150 years. The 1908 Tunguska explosion occurred exactly in/over the main vent of the Kulikovsky paleovolcano [19]. According to geologists, the volcano had five stages of activity from the times of Siberian Flood Basalts (~252 Myr ago) to the 1908 explosion [20]. All events were, probably, connected with the 'Perm LLSVPs Anomaly' located under Eurasia on the Earth's core-mantle boundary [21]. Moissanite formations (SiC-SiC₂₀) in layers of both the mud-volcanic phase (7320 years) and 1908 were discovered [20]. Therefore, their genesis is the decisive factor for the 1908 Tunguska event's nature.

Summary

The 1908 Tunguska event was not related to the collision of the Earth with a comet or asteroid and could be most probably a tectonic event caused by common solar-lunar-terrestrial perturbances [10].

References

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