

## Origin and flows of the methane to Earth atmosphere

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The results of the research of the ice core sample of the Antarctic and Greenland glaciers displayed that the contents of methane in atmosphere in the last 800000 years has been changing with the period of about 100000 years. The contents has increased almost twice as much during the age of the climatic optimum in comparison with the climatic deterioration. High methane contents in the atmosphere in climatic optimum of Holocene (last 11000 years) have rapidly increased over the course of the past century. The prognosis of their further changes depends on the correctness of the estimations of methane flows to the atmosphere from different sources. It is assumed that the increase of methane flows to the atmosphere in climatic optimum of Holocene resulted first of all from the degradation of gas hydrates and increase of bog areas. Moreover, permafrost thawing and gas hydrate stability zone thickness reduction entailed the increase of through discharges of hydrocarbons to the atmosphere. However, the measurements made by Russian and Japanese microbiologists at the bog areas of West Siberia, showed that methane generation and methane flows to the atmosphere turned out to be by an order lower than had been expected. The peat bituminess testifies to the fact that at the peat-bogs there was no methane outgassing but the utilization of ascending methane flows to the atmosphere.  $2 \cdot 10^{14}$  grams of isotopic light carbon was accumulated in peat-bogs during the Holocene. Consequently, the principal source of the increase of methane content in the atmosphere were the flows of methane formed as a result of permafrost thawing and gas hydrates degradation, but not due to the flows of peat methane. This conclusion is in conformity with the recorded augmentation of the amount and area of the lakes in subpolar regions of the North-East of Russia and Canada. The area of the global methane anomaly in the atmosphere is located above these regions in the North hemisphere of the Earth.

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## A new search for tremolite in the chrysotile asbestos deposit at New Idria, California

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In May, 2008, the U.S. Environmental Protection Agency (EPA) released a study of airborne dust in a portion of the New Idria district of Central California. New Idria contains the world's largest deposit of chrysotile asbestos. The EPA study is controversial because it mentions significant concentrations of tremolite asbestos fibers comingled with chrysotile asbestos fibers. This observation is at variance with what is known about the bedrock geology of the area [1, 2] and suggests the possibility of sampling issues or an external source. Citing increased public health risks due to the discovery of tremolite, EPA has ordered the area closed to the public. This in turn has created a public outcry.

In order to address the possibility that tremolite may have been somehow overlooked in previous studies of this region, we have re-sampled and analyzed selected samples from a well-studied and characterized portion of the New Idria district, the nearby chrysotile asbestos mine owned by the KCAC corporation. This locality has been the subject of numerous previous studies [op. cit.] Using TEM methods, along with a modified version of the Addison & Davies [3] concentration technique, our diligent searching failed to find any tremolite asbestos fiber contamination in the chrysotile samples, with a detection limit of better than 0.01%.

Our results show that samples from this locality are consistent with the results of previous studies that show the deposit is dominated by short fiber chrysotile, with minor antigorite, brucite, magnetite, and rare accessory minerals including coalingite. The New Idria deposit is not intruded by basaltic dikes that have become rodingites rich in calc-silicate minerals. This latter process is responsible for the minor tremolite found at Asbestos, Quebec and other similar localities. [4] It is also possible that tremolite mentioned in the EPA study may have an external source, in the surrounding metavolcanic rocks of the Franciscan Formation.

[1] Mumpton & Thompson (1975) *Clays and Clay Minerals*, **23**, 131-143. [2] Van Baalen (1995) Ph.D. dissertation, Harvard University. [3] Addison & Davies (1990) *Ann. Occ. Hyg.* **34**, 159-175. [4] Williams-Jones *et al.* (2001) *Can. Min. Spec. Pub.* **5**, 89-104.