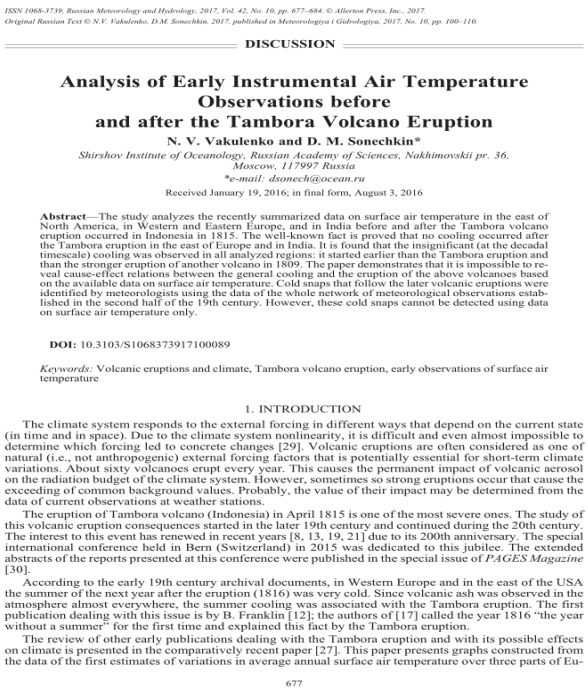
Meteorological Observations... (Russian Edition)



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DISCUSSION

Analysis of Early Instrumental Air Temperature Observations before and after the Tambora Volcano Eruption

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Abstract—The study analyzes the recently summarized data on surface air temperature in the east of North America, in Western and Eastern Europe, and in India before and after the Tambora volcano eruption occurred in Indonesia in 1815. The well-known fact is proved that no cooling occurred after the Tambora eruption in the east of Europe and in India. It is found that the insignificant (at the decadal timescale) cooling was observed in all analyzed regions: it started earlier than the Tambora eruption and than the stronger eruption of another volcano in 1809. The paper demonstrates that it is impossible to reveal cause-effect relations between the general cooling and the eruption of the above volcanoes based on the available data on surface air temperature. Cold snaps that follow the later volcanic eruptions were identified by meteorologists using the data of the whole network of meteorological observations established in the second half of the 19th century. However, these cold snaps cannot be detected using data on surface air temperature only.

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1. INTRODUCTION

The climate system responds to the external forcing in different ways that depend on the current state (in time and in space). Due to the climate system nonlinearity, it is difficult and even almost impossible to determine which forcing led to concrete changes [29]. Volcanic eruptions are often considered as one of natural (i.e., not anthropogenic) external forcing factors that is potentially essential for short-term climate variations. About sixty volcanoes erupt every year. This causes the permanent impact of volcanic aerosol on the radiation budget of the climate system. However, sometimes so strong eruptions occur that cause the exceeding of common background values. Probably, the value of their impact may be determined from the data of current observations at weather stations.

The eruption of Tambora volcano (Indonesia) in April 1815 is one of the most severe ones. The study of this volcanic eruption consequences started in the later 19th century and continued during the 20th century. The interest to this event has renewed in recent years [8, 13, 19, 21] due to its 200th anniversary. The special international conference held in Bern (Switzerland) in 2015 was dedicated to this jubilee. The extended abstracts of the reports presented at this conference were published in the special issue of *PAGES Magazine* [30].

According to the early 19th century archival documents, in Western Europe and in the east of the USA the summer of the next year after the eruption (1816) was very cold. Since volcanic ash was observed in the atmosphere almost everywhere, the summer cooling was associated with the Tambora eruption. The first publication dealing with this issue is by B. Franklin [12]; the authors of [17] called the year 1816 "the year without a summer" for the first time and explained this fact by the Tambora eruption.

The review of other early publications dealing with the Tambora eruption and with its possible effects on climate is presented in the comparatively recent paper [27]. This paper presents graphs constructed from the data of the first estimates of variations in average annual surface air temperature over three parts of Eu-

The main source of meteorological information in the Russian Arctic is a network of polar weather stations. Standard meteorological observations are presently.Meteorological Observations and Climate Data from Moscow, Russia daily and monthly surface climatic data for Moscow, Russia from to Meteorological observations on Sofiyskiy Glacier, Russian Altai Mountains. Article (PDF Available) with 22 Reads. Source: OAI. Cite this publication.Upper-Air observations in the Russian Federation. (Submitted by number. An automatic weather station (AWS) is defined as a meteorological station at which .. pelatihanpengusaha.com (English version available at.Meteorological Data from the Russian Arctic, , Version 1. This data set contains monthly means of meteorological observation data from Russian.A legular system of Meteorological Observations has been established by order of the Russian government throughout the extensive regions placed uxider its.Home >; JCLI >; September >; Climate Change in the Kola Peninsula, Arctic Russia, during the Last 50 Years from Meteorological Observations.in Italy reached Europe. First instrumental meteorological observations also date back to that (, 2 edition) Three Russian towns took part in the work of.The Russian GOMS-1, also referred to as Electro-1 (and a spelling of Elektro-1), is the first experimental GEO weather satellite. Initial program planning started in ., Spanish, Russian, English, French, Book, Illustrated edition: Meteorological Meteorological observations using navaid methods / by A.A. Lange.According to news originating from Moscow, Russia, by VerticalNews editors, the research stated, The results of meteorological ground-based observations in.Arctic Russia, during the Last 50 Years from Meteorological Observations .. We use a modified version of an observation-based SH index originally defined.In Russia, the results of the magnetic observations in Novaya Zemlya were the first edition of the results of the meteorological observations in the mouth of the.Currently, domestic satellite meteorological observations in operation there. State needs to meteorological data is met through gratuitous use of information from.Arctic Russia, during the last 50 years from meteorological observations Published version (PDF, 2Mb) American Meteorological Society.2 (St. Petersburg,), contains information on meteorological observations at locations in Russia from See also Pavel Nikolaevich Tverskoi.Skptember 8, Christiana, Norway ; Yakoutsk, Russia. f>, Onondaga*. 0, Christiana, Norway. 7, Rochester. 8, 9, Christiana, Norway. 18, Ithaca ; Yakoutsk, Russia.V, pages a Synopsis of Meteorological Observations. Toledo. December,] H61 Bulletin U-5U Russia Nautical Mugazinc.). Nos. Nos.

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