

RUSSIAN/FSU TROPICAL CYCLONE RESEARCH: THE LAST 25 YEARS

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1. INTRODUCTION

Tropical cyclones (hurricanes, typhoons) have been studied by researchers in Russia (and the Former Soviet Union). Not only do these storms pose a threat to ships at sea, but the Far East Region of Russia even feels their effects on occasion. Since the late 1960s there has been an increasing number of Soviet/Russian articles on tropical cyclone research. These have largely appeared originally in the Russian language, however English translations have been published shortly thereafter. Nevertheless a survey of the general tropical cyclone research literature reveals little reference to the large body of Soviet/Russian research. In this paper we review this research, detailing the various primary lines of study, highlighting the work of specific prolific authors and recalling some of the important field projects for the last 25 years.

2. SOURCES

The bulk of the research articles have appeared in *Soviet/Russian Meteorology and Hydrology*, *Izvestia*, *Atmospheric and Oceanic Physics*, *Doklady*, *USSR/Russian Academy of Sciences*, *Oceanology*, and *Earth Observations and Remote Sensing*. In addition there have been numerous monographs published by Gidrometeoizdat (Leningrad) and books. Conference proceedings have appeared, as well as volumes devoted to special tropical cyclone field projects. Well over 300 articles by more than 100 different authors

have been identified. For the last quarter century the number of publications has averaged about a dozen per year.

Many - but not all - of these articles have been cited in *Meteorological and Geostrophysical Abstracts*. In addition for recent years there are web pages for individual journals and researchers (sometimes in English as well as Russian). Through interlibrary loan at Texas Tech University, it has been possible to obtain the majority of articles and some of the monographs; these in turn have cited still other works which have then been requested.

3. EARLIER WORK

Somewhat more than 50 papers have been identified for the period earlier than 1976, back to Khromov (1940). By the 1960s there were many publications each year, including monographs (e.g., *Hurricanes*, by Tiron (1964) and *Betsy, Camille and Others* by Sitnikov (1975)) and papers by authors who continued to publish into the last quarter century (e.g., Minima, Sitnikov, Shuleykin, Zakharov et al.). Best known perhaps, because it was translated into English, was the book by Nalivkin (1969), *Hurricanes, Storms and Waterspouts*.

4. THE LAST 25 YEARS

Several of the recent research themes have continued from the earlier era; other topics are new. Still there are specific questions which are especially prevalent in the Russian/FSU research; these have undoubtedly been dictated by issues of national interest, the available tools for research, and the capabilities of individual investigators.

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One of the most frequent topics has been the combined air and sea motions for tropical cyclones (e.g., Sutyurin, Khain, Falkovich, Ginis). Particular attention has been paid to the properties of tropical cyclone wakes (e.g., Pudov). Modeling of the hydrodynamics of the core region of tropical cyclones has been considered (e.g., Dobryshman). Based on classical hydrodynamic principles mutual interactions between two or more storms has been investigated (e.g., Pokhil, Petrova). The global patterns of tropical cyclone occurrence have been detailed (e.g., Pokrovskaya, Sharkov, Golitsyn). There have been relatively few articles on track (e.g., Sitnikov) and intensity forecasting and case studies of individual storms (e.g., Yurchak). There have in fact been several papers on the interactions of tropical storms with the ozonosphere (e.g., Gushchin, Nerushev). Seismic detection of storm activity has been investigated as well (e.g., Yaroshevich).

5 CONCLUSIONS

Russian and Soviet investigators have pursued many lines of tropical cyclone research over the last quarter century; the work deserves more recognition.

6. REFERENCES

The journal names are abbreviated as:

AO *Izvestia, Fizika atmosfery i okeana* transl. *Atmospheric and Oceanic Physics*

AK *Doklady, Akademiia Nauk, SSSR*, transl. *Transactions, Russian Academy of Sciences*

MH *Meteorologiya i gidrologiya*, transl. *Soviet Meteorology and Hydrology* (19??- 1992), *Russian Meteorology and Hydrology* (1993-)

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