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ABSTRACTS

Local Organizers SCIENCE
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F5-p-1

F5:Remote Sensing of Land

Helicopter Radiometry of Oil Pollutions on Lakes and Soils

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Introduction

The problem of oil spills air—borne monitoring is very important ecology problem not only for sea, but also for some continental regions. The radiometric method has very strong sensitivity to oil presence on the water and ground surfaces.

Two-frequency measurements of thermal radio emission and results of the analysis

In May and Oktober 1992 radiometric measurements on wavelengths 0.8 and 3 cm of oil pollution near Nihznevartovsk (West Siberia, Russia) of oil spills on lakes and soils have been carried out. The size of oil spills was from about 100 to 2000 m. The point and profile (along flight line) measurements more than 20 pollution places have been used to evaluate the total oil volume in the region.

The interpretation and computer algorithm are based on the two-layered model. It was found, that dielectric constant of the oil layer departs drastically from the clear oil value, obviously, because of precipitations influence, which forms oil-water emulsion. The analysis method is worked out to determine both oil depth and volume fraction of water in emulsion. If there are oil depth variations in the spill, it is possible to determine additional free parameters, such as temperature or mean square depth variations in the foot-print.

It was discovered the effect of temperature increasing of the oil layer on lakes up to 10 - 20 K (at free water temperature 0 C) in the presence of Sun radiation.

In the fig.l is shown the radio brightness image of the oil pollution at 0.8 cm and in the fig.2 - the corresponding 3-dimensional oil depth distribution.

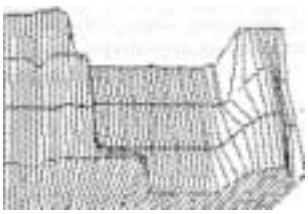

Fig.l

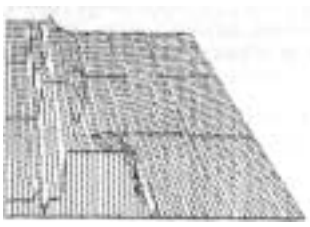

Fig.2

Discussion and conclusion

The results of our investigations lead to the conclusion, that the radiometric method can be useful in oil pollution monitoring.