Advances in the detection of oil pollution by remote sensing

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Mineral oil spills appear on the ocean surface radar images as dark patches. However, dark patches can also be caused by natural surface films floating on the sea surface. These natural surface films are produced by plankton or fish and are often encountered in coastal regions where the biological productivity is high.

Monomolecular surface films reduce the radar backscattering cross section by a similar amount as do mineral oil films. This implies that the exclusive application of a single-frequency radar for monitoring oil pollution would often lead to false alarms.

However, there seems to exist a possibility to discriminate between mineral oil films and monomolecular sea slicks by using multi-frequency radars. This technique exploits the fact that the damping of ocean surface waves exhibits a resonance-type behaviour in the short gravity wave region which can be described by Marangoni wave damping theory (see e.g., CINI and LOMBARDINI, 1978).

Results of multifrequency radar backscattering measurements carried out over several artificial monomolecular sea slicks of different physico-chemical properties and over mineral oil spills in the North Sea are presented. They show that the functional dependence of the reduction in backscattered power on radar wavelength and incidence angle is quite different for monomolecular sea slicks and mineral oil films.

It is proposed to exploit this difference in developing a multifrequency radar technique by which it is possible to discriminate between mineral oil films and natural surface films.

REFERENCES

CINI R. and LOMBARDINI P.P., 1978. - Damping effect of monolayers on surface wave motion in a liquid, *J. Colloid Interface Sci.*, 65, 387-389.