



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
 ESG/NESS  
 Hillcrest Heights, Maryland 20031

Date: July 13, 1973

Reply to  
 Attn of: S33

Subject: ERTS-1 Anomalous Dark Patches

To: Distribution

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**E7.3 10747**  
**CR -133/15**

NOTICE

SIGNIFICANT RESULTS - ERTS-1

Through combined use of imagery from ERTS-1 and NOAA-2 satellites we have demonstrated that whenever the sun elevation exceeds 55°, the ERTS-1 imagery is subject to considerable contamination by sunglint even though the actual specular point is nearly 300 n. mi. from nadir. Based on sea surface wave slope information, a wind speed of 5 m sec<sup>-1</sup> (10 knots) will theoretically provide approximately 0.5% incident solar reflectance to be observed by ERTS-MSS detectors. This reflectance nearly doubles under the influence of a 10 m sec<sup>-1</sup> wind. However, the most pronounced effect occurs in areas of calm water where anomalous dark patches are observed. No brilliant sunglint (that may exceed 50% reflectance for calm water close to the specular point) can appear in the ERTS-1 imagery. Calm water at distances from the specular point found in ERTS scenes, however, will reflect no solar energy to the MSS, making these regions stand out as dark areas (in all MSS bands) in an ocean scene otherwise comprised by a general diffuse sunglint from rougher ocean surfaces.

Anomalous dark patches associated with glitter areas are commonly observed in NOAA, Nimbus, ATS, Gemini, Apollo, and aircraft photographs of calm and near calm water (McClain and Strong, 1969, Mon. Wea. Rev., 97: 875-884). It is virtually certain that anomalous dark patches in the outer parts of the glitter zones explain the following scenes many investigators have been puzzling over:

- (1) Rhode Island Sound - 28 July 1972  
 (both sediment and glint effects)
- (2) Numerous Cape Verde scenes - eg. 13 Aug. 1972
- (3) Lesser Antilles - 14 Oct. 1972
- (4) Monterey Bay etc. - 25 July 1972
- (5) Lake Michigan - 10 July 1973
- (6) Santa Barbara Channel - 26 May 1973

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(E73-10747) ERTS-1 ANOMALOUS DARK  
 PATCHES (National Environmental Satellite  
 Services) 2 p HC ~~\$1.00~~ CSCL 14E

N73-26351

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This latter scene was observed by NOAA-2 under identical meteorological conditions on the following day when the specular point and attendant high reflectances highlighted precisely the same dark areas seen by ERTS 24 hours earlier, thereby demonstrating that nothing more than calm water could account for the observed dark areas.



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