

Icarus Review Submission(10/10/07 at 14:12:42 EDT)

MANUSCRIPT: I10258

AUTHORS: M. Shepard et al

SHORT TITLE: Radar observations of E-class asteroids...

Reviewer: Bruce Campbell

REVIEW SUMMARY

- (a). Do you recommend that this manuscript be accepted for publication?
Yes, but with minor revisions
- (b). The overall length of the text in this manuscript is:
About right to describe the work and its significance
- (c). The amount of display material (tables and figures) is:
About right

COMMENTS FOR THE AUTHORS

This is a well-written, concise paper presenting radar data for two main-belt E-class asteroids. The findings support similar results obtained for a larger sample of E-class near-Earth objects. I recommend publication with the minor changes listed below.

Page 4:

1. The terms "expected" and "unexpected" are not explained, which is fine in the context of a short paper, but these could be deleted for clarity. The terms "same sense circular" and "opposite-sense circular polarization" are more descriptive of the actual observations.
2. The references to circular polarization ratio values (smooth versus rough or deep-scattering surfaces) are limited to asteroid papers. There are recent papers on Mars (Harmon 7th Mars abstract) and Moon echoes (D. Campbell et al., Nature) with similarly high 12.6-cm values.
3. The discussion of why MBA's have lower CPR is short, and needs at least a note that the "thicker regolith" is taken to have fewer wavelength-scale surface and volume rocks.

Pages 5 and 7: The discussion of "second highest" for Nysa (pg. 5) and "surpassing Nysa" (pg. 7) is awkward. Perhaps just mention their values in the text then point out their rank order in the discussion.

Page 6. The rationale for $C=0.5$ being "geometric scattering" is not clear. This term seems like it would be linked with quasi-specular

reflections rather than diffuse. Perhaps just a reference or short description.

Discussion:

1. "Nevertheless, both are significantly", could be clearer, e.g.: "Nevertheless, both values of τ_c are significantly higher than observed for any other main-belt asteroid, suggesting a geologic mechanism common to E-class MBAs and NEAs".

2. The idea of long-preserved crystal structures forming the detailed topography of an asteroid seems speculative, though perhaps this is developed in detail in the Science submission. The authors should discuss, briefly, the possibility for densely spaced, wavelength-scale blocks (such as seen by the Hayabusa mission) as another source of highly depolarized scattering.

3. The discussion of radar albedo needs to be sharpened. While the SC echoes are high, there is a substantial part of the diffuse echo present in the OC return (the 2nd-to-last sentence is awkward on this). The higher radar albedo could be due to some combination of higher bulk density and/or an increased population of surface and near-surface rocks (relative to a thick-regolith case with few rocks).