REFLECTIONS ON THE GEOLOGY OF 243 IDA. P. J. Stooke, Department of Geography, University of Western Ontario, London, Ontario, Canada N6A 5C2 (stooke@sscl.uwo.ca)

INTRODUCTION. I have reassessed aspects of the geology of asteroid 243 Ida as part of a comprehensive mapping program. I find that the division into two regions on the basis of large crater densities is spurious and that the 'waist' which divides the two regions is probably not structural but composed of overlapping craters. The 10 km crater Azzura contains a 3 km crater which is probably the source of fresh ejecta in the north polar region. Other fresh materials on Ida are probably ejecta from other roughly 3 km craters including one deep in the south polar depression. Newly identified dark-floored craters occur all around Vienna Regio, and lineaments can be mapped around Castellana and Vienna Regio. Smooth deposits occur on some steep dynamic slopes, mostly on rotational leading surfaces.

CRATERS. Thomas *et al*. (**1**) identified 6 craters over 9 km in diameter on Ida, and claimed that since none occurred in the half of Ida centred on Vienna Regio, that half ("Region 1") was mechanically or otherwise different from the other end ("Region 2"). Vienna itself was not counted as a crater. Undara and a degraded 7 km crater to its south, which form part of the 'waist' between Regions 1 and 2, were included in Region 2. The concave region around longitude 270 was also not counted as a crater. If Vienna is included in the crater count, and various depressions forming the waist are counted half in each region, the discrepancy between regions is reduced. In addition, I find several very degraded probable craters not counted in ref. (**1**). The most obvious is one containing Choukoutien and other dark-floored craters, referred to in ref. (**2**). Palisa Regio is slightly concave and has an arcuate southern edge, suggesting it may be a very degraded crater. Other possible large craters, some very faint, are mapped in Figure 1. Orgnac is probably a composite of several smaller craters, and might not belong on the list of large craters in (**1**). These points weaken the argument for division of Ida into regions with different properties or ages. The waist is at least as likely to be a chance superimposition of large craters as a structural feature. I consider the shape of Ida to be explained by two very large facet-forming (order 2) impacts, 25 or 30 km across, one at each pole, and various other superposed large craters. Townsend Dorsum is probably a composite of the rims of several of these facets and craters. Its linearity may still reflect interior structure, but it may be exaggerated by a deposit of smooth material like that inside Vienna Regio.

The 10 km crater Azzura is described as having spread fresh ejecta (**3**) and blocks (**4**) around much of Ida. Low resolution views reveal a younger 3 km crater inside its eastern rim, and there are other possible craters within Azzura. Thus Azzura is unlikely to be as young as previously supposed, and the 3 km crater is probably the source of the fresh ejecta in the northern region of Ida. Simulations (**3**) predict fresh ejecta south of Azzura, but this is observed only in the South Polar depression, not near the equator. Thus the southern fresh material may have a different source. Image 202549100 shows a bright-rimmed 3 km crater at about 50 S, 160 W which is probably the source of southern hemisphere ejecta and blocks. Fresh ejecta in southern Palisa Regio may be part of that south polar deposit, or possibly ejecta from a crater beyond the terminator near Polojna. Fresh material northeast of Undara may also be locally derived, since a bright 4 or 5 km crater lies just north of the limb of the highest-resolution images in that area .

DARK-FLOORED CRATERS. A cluster of dark-floored craters occupies the floor of a very degraded crater on the outer east rim of Vienna Regio (**2**). I tentatively identify several others. Crater **Atea** has a very smooth floor slightly darker than its surroundings and unlike any other crater floor in the vicinity. If seen at high sun, this might look like a typical dark-floored crater. Crater **Viento** (13 N, 345 W) is very dark in all images which resolve it, including those with the sun almost overhead. A similar crater at 5 N, 338 W is also dark at high sun angle in image 202554800, despite low resolution. Several dark spots or streaks in the smooth deposit on the inner east rim of Vienna are visible in all suitable images regardless of sun azimuth. It seems that material which appears dark at high sun is widespread around Vienna Regio, either exposed by or created by smaller impacts into Vienna rim materials. There may be small examples of such craters on the northern rim of Undara.

LINEAMENTS. Lineaments have been mapped previously, though there are discrepancies between published maps. I find additional lineaments (grooves or crater chains) in Vienna Regio, including several near Viento and others in the smooth deposit on the eastern rim. Super-resolution composites of medium-resolution images suggest others (one elongated trough and others which are probably linear ridges) around Castellana, west of Vienna. The latter occur immediately north of an area predicted to have suffered surface damage from the Vienna impact (**5**), offering support for the view that lineaments in Pola Regio have the same origin.

SMOOTH DEPOSITS. The inner west-facing slope of Mammoth is smoother than areas outside the crater and on its inner north slope. The west-facing inner east rim of Vienna Regio at 20 N, 10 W is very smooth, possibly convex, and contains dark spots or streaks. The terrain between Castellana and Vienna is also unusually smooth. These areas are **steep slopes** on **rotational leading surfaces**. A thicker and more mobile regolith is probably the cause of the smooth terrain, as also suggested for Gaspra (**6**). Additional smooth material may be present on Townsend Dorsum and on the equator between longitudes 210 and 230, south of Azzura, on a rotational trailing surface but one with a very steep dynamic slope.

REFERENCES. (**1**) Thomas, P.C. *et al*. (1996), *Icarus* 120: 20-32. (**2**) Sullivan, R. *et al*. (1996), *Icarus* 120: 119-139. (**3**) Geissler, P. *et al*. (1996), *Icarus* 120:140-157. (**4**) Lee, P. *et al*. (1996), *Icarus* 120: 87-105. (**5**) Asphaug, E. *et al*. (1996), *Icarus* 120: 158-184. (**6**) Stooke, P.J., *Earth, Moon, Planets* (in press).

Figure 1. Geological sketch maps of Ida, Morphographic Conformal Projection, central longitudes 100 (top), 280 (middle), and 0 (bottom). The bottom map extends 30 degrees in each direction from the equator and 0 longitude. The projections are based on the convex hull of Ida. **Dashed loops**: Order 2 craters and facets; **Solid loops**: Order 3 craters; **Filled loops**: dark=floored craters; **Heavy lines**: lineaments; **Dot pattern**: smooth deposits.