Geology and topography of a potential landing site near Lunar South Pole

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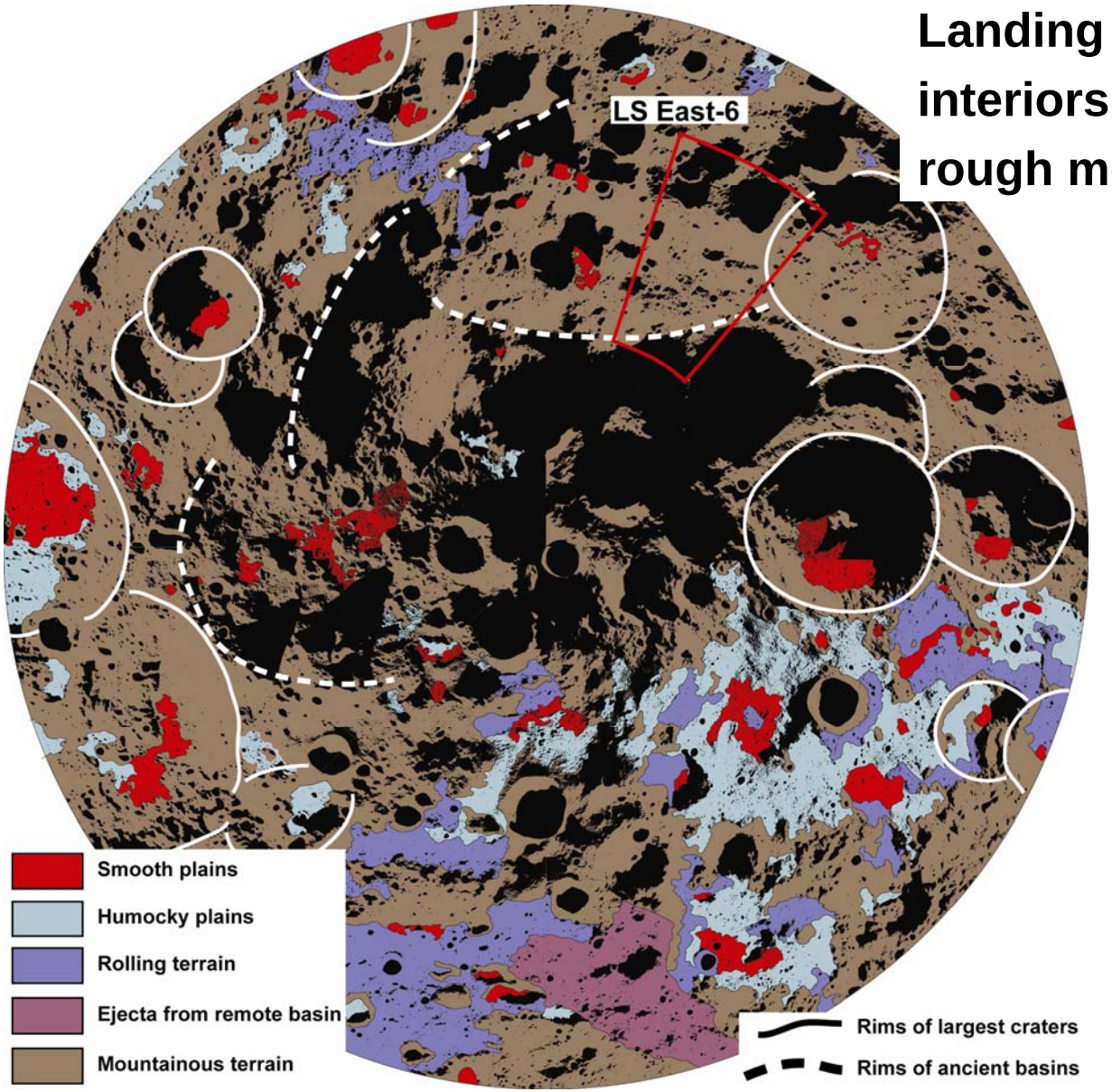
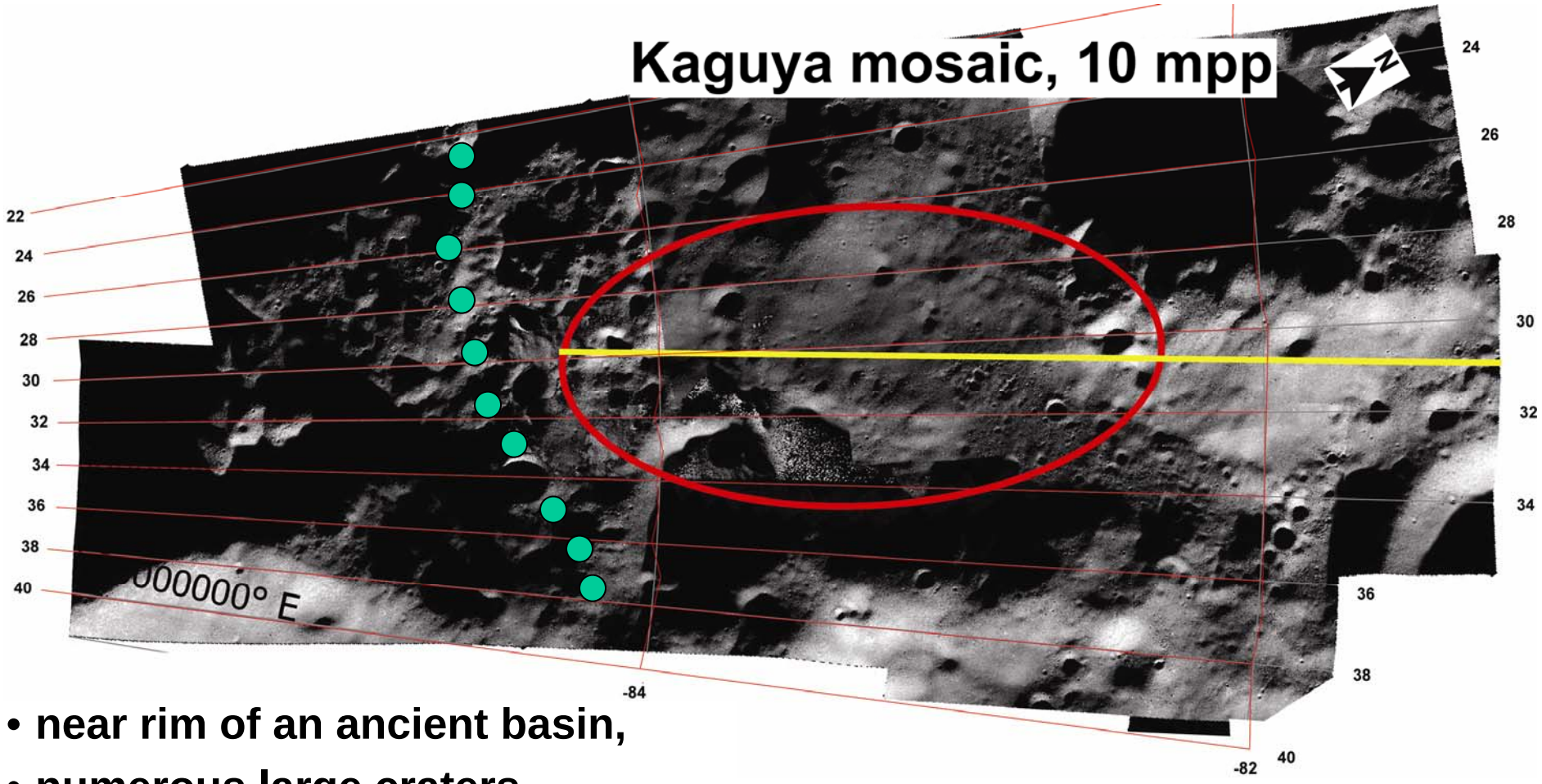
South Pole: general geology



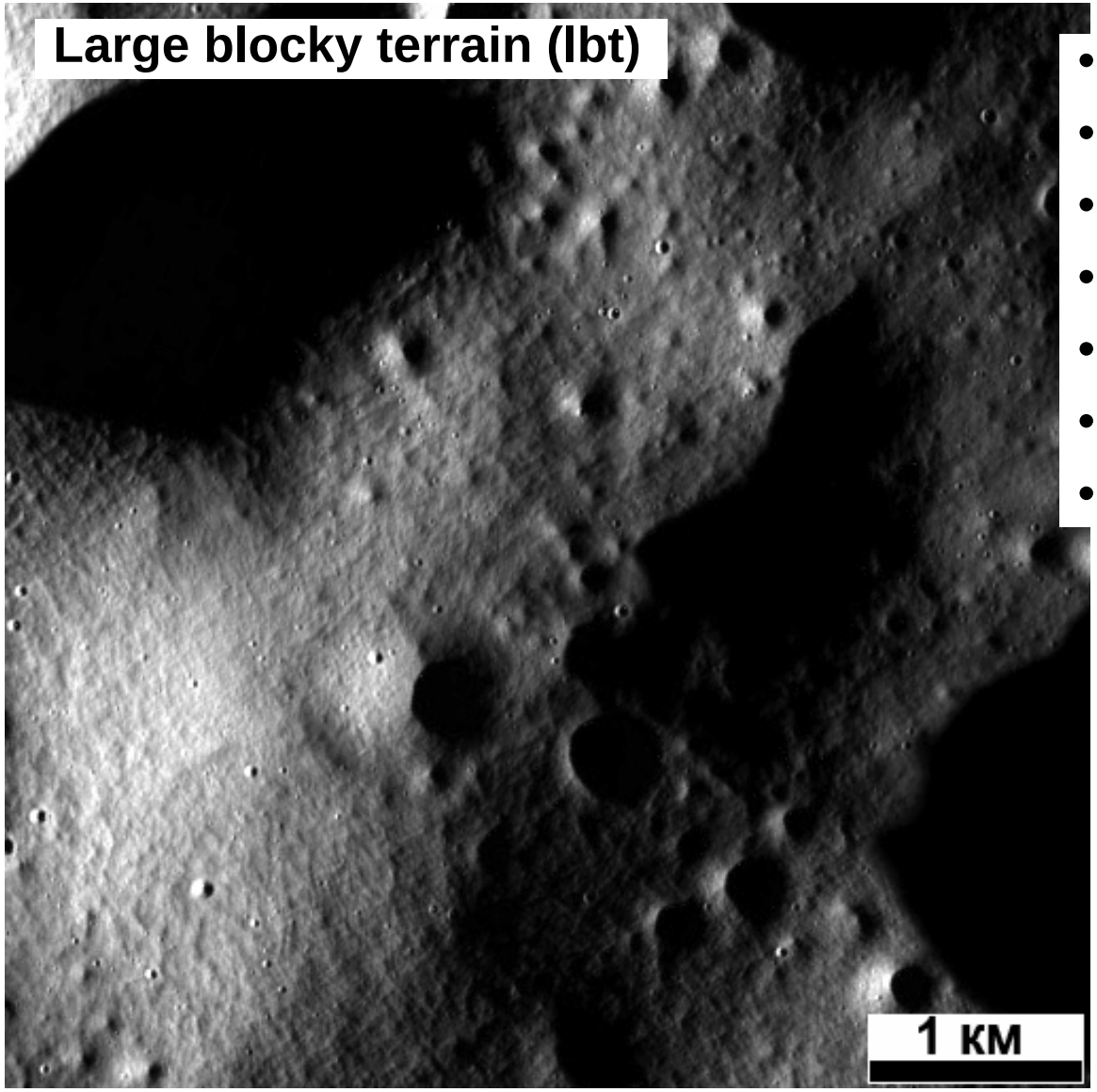
Landing site East-6:
interiors of an ancient basin,
rough mountainous terrain.

Site East-6: general geology



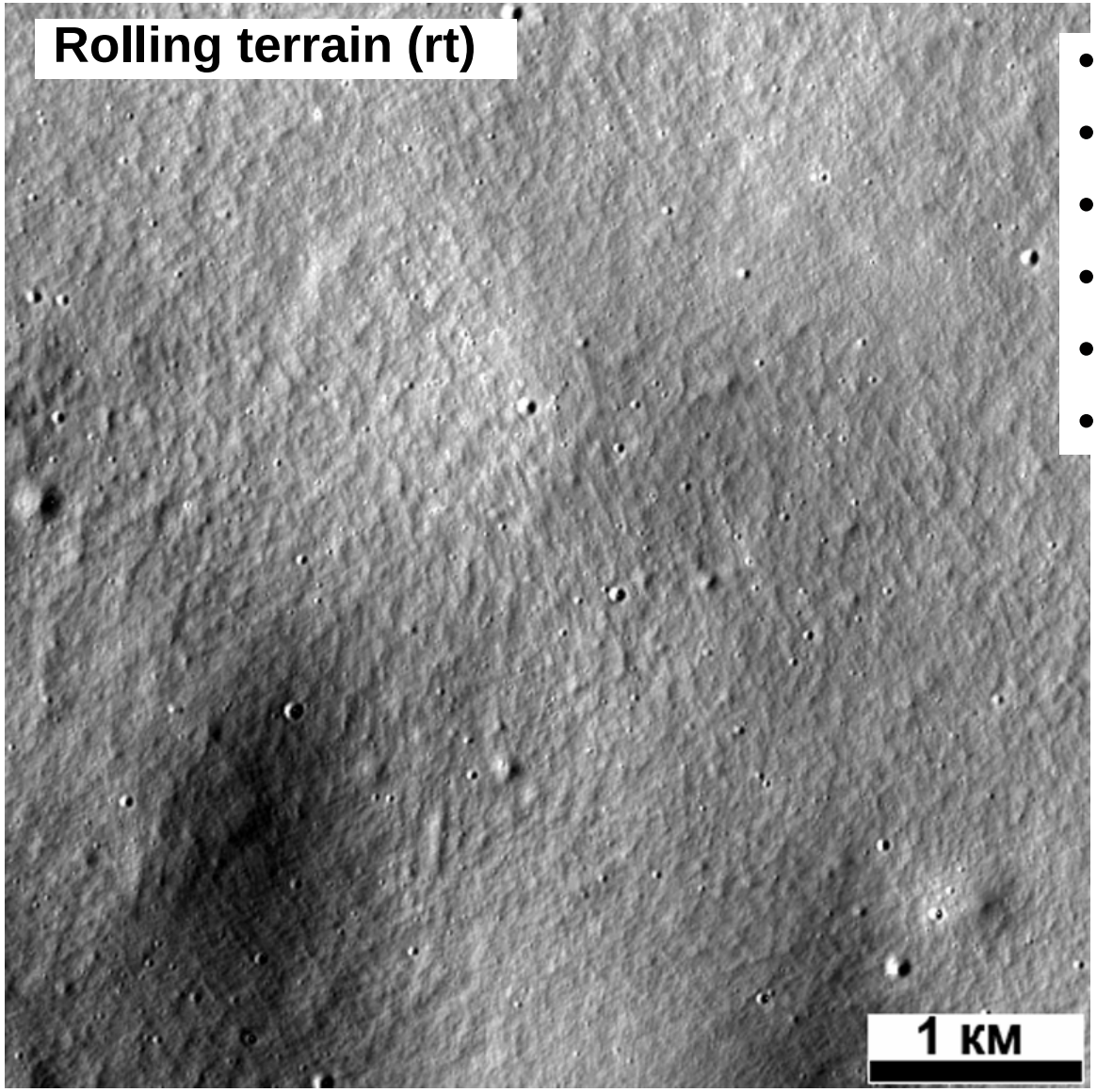
- **near rim of an ancient basin,**
- **numerous large craters,**
- **rougher topography: rim,**
- **smoother topography: interiors.**

Site East-6: units



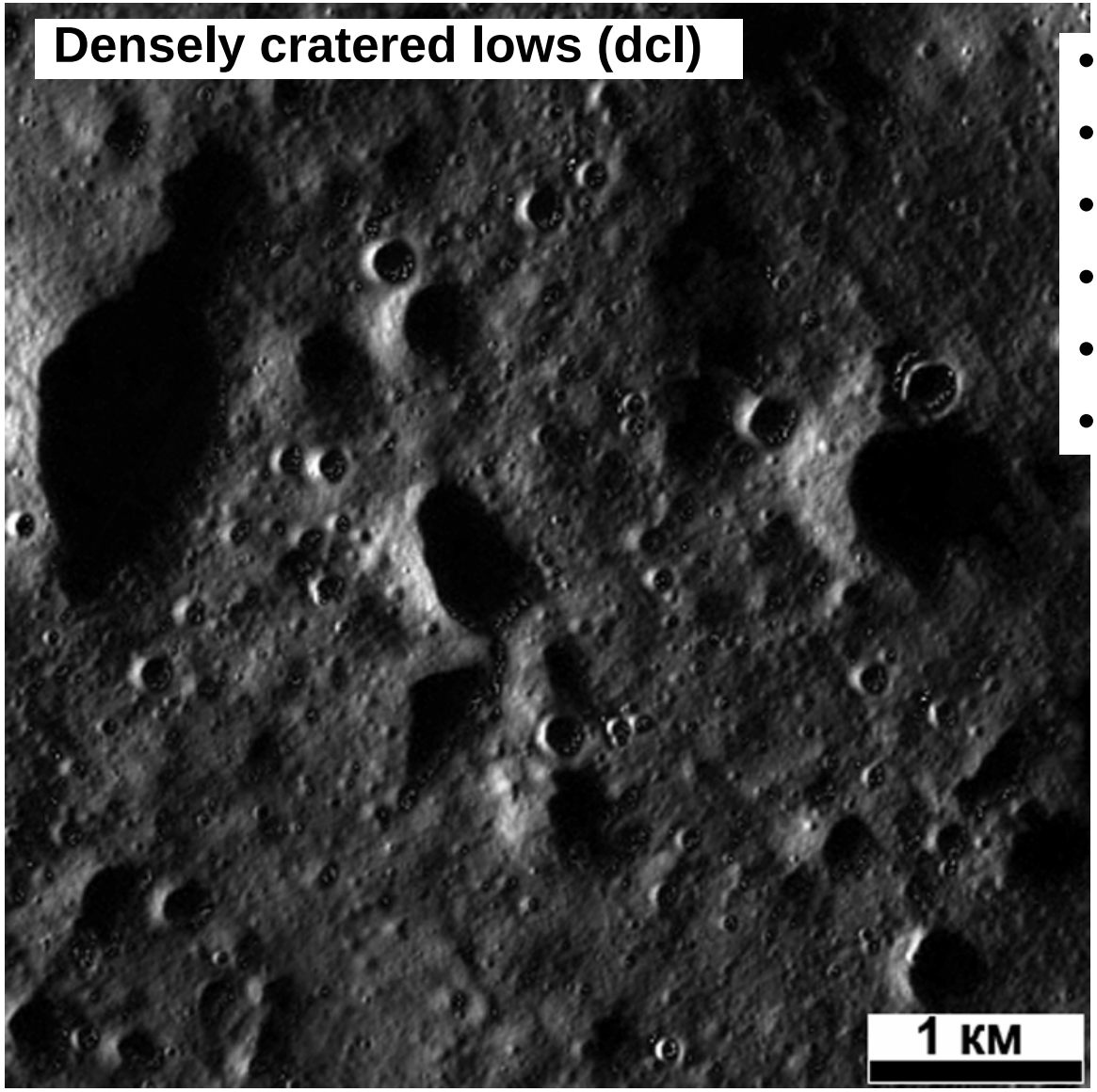
- **near rim crest,**
- **numerous shadows,**
- **large blocks (tens of km),**
- **blocks are smoothed,**
- **topography varies much,**
- **formed by large impacts,**
- **~30% of illuminated area.**

Site East-6: units



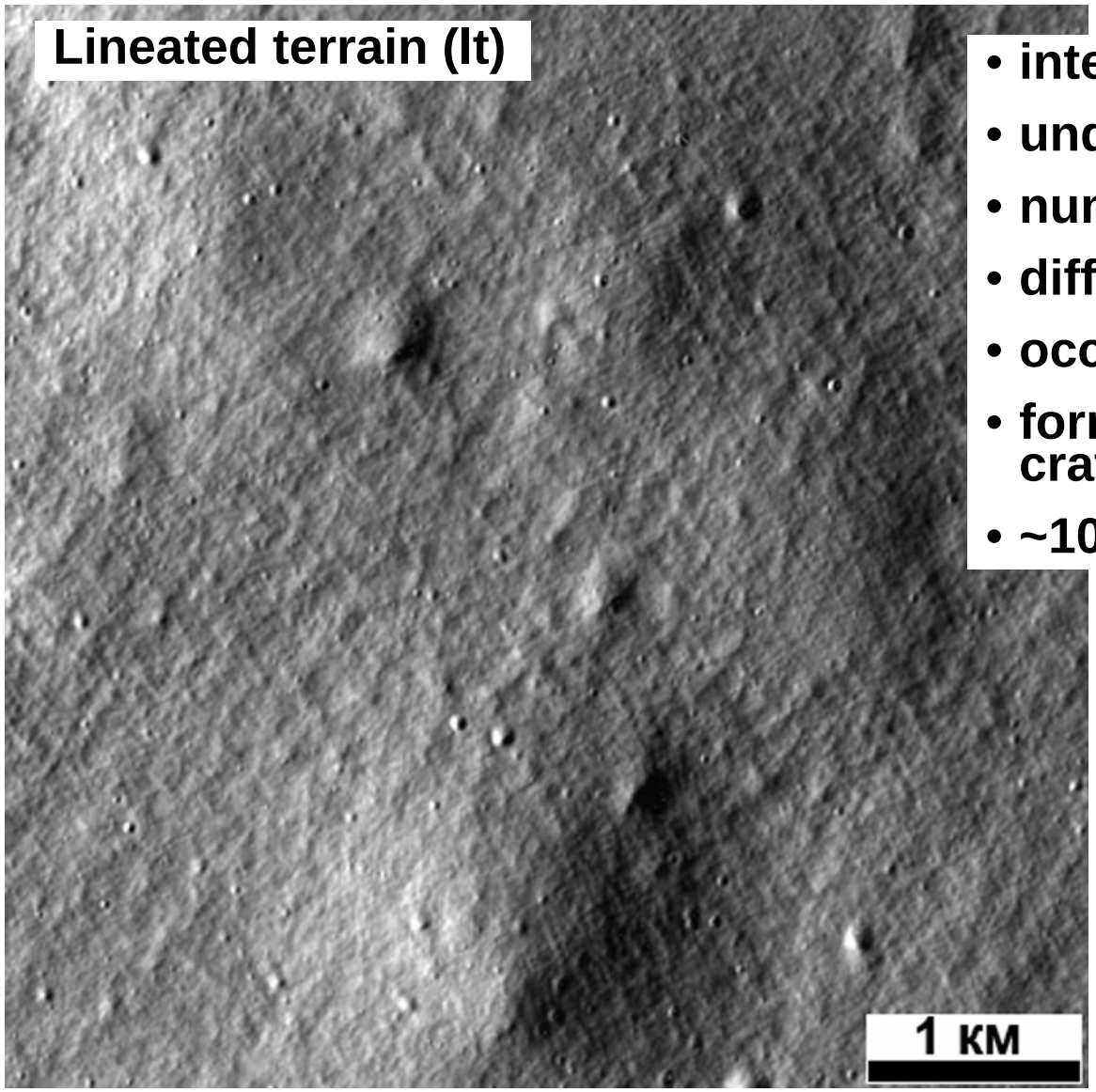
- **interiors of the basin,**
- **gentle hills,**
- **hills are 2-5 to 10-15 km,**
- **hills are smoothed,**
- **formed by large impacts,**
- **~49% of illuminated area.**

Site East-6: units



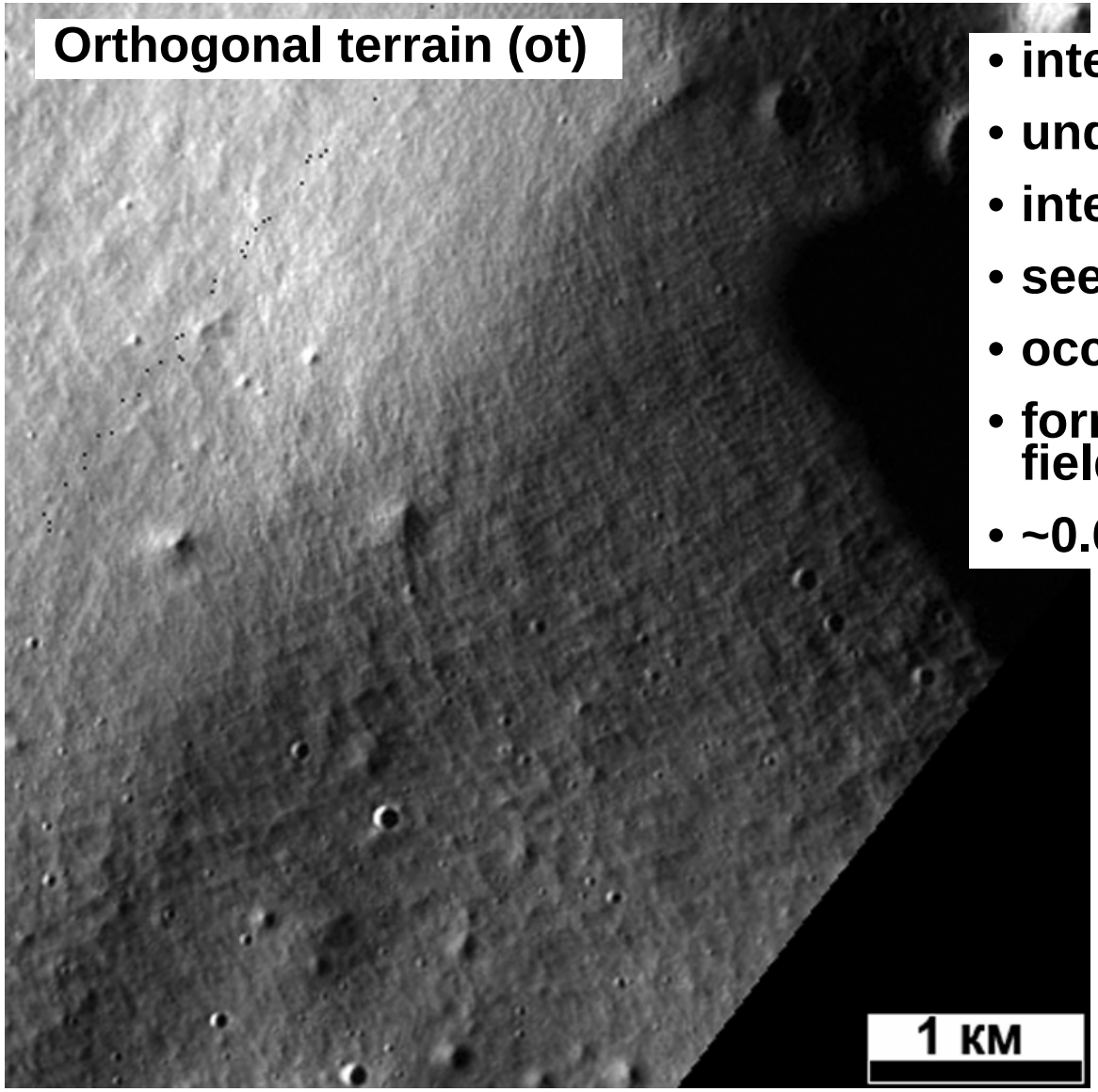
- **interiors of the basin,**
- **flat/horizontal surface,**
- **very heavily cratered,**
- **craters: 1s to 100s m,**
- **formed by secondaries,**
- **~9% of illuminated area.**

Site East-6: units



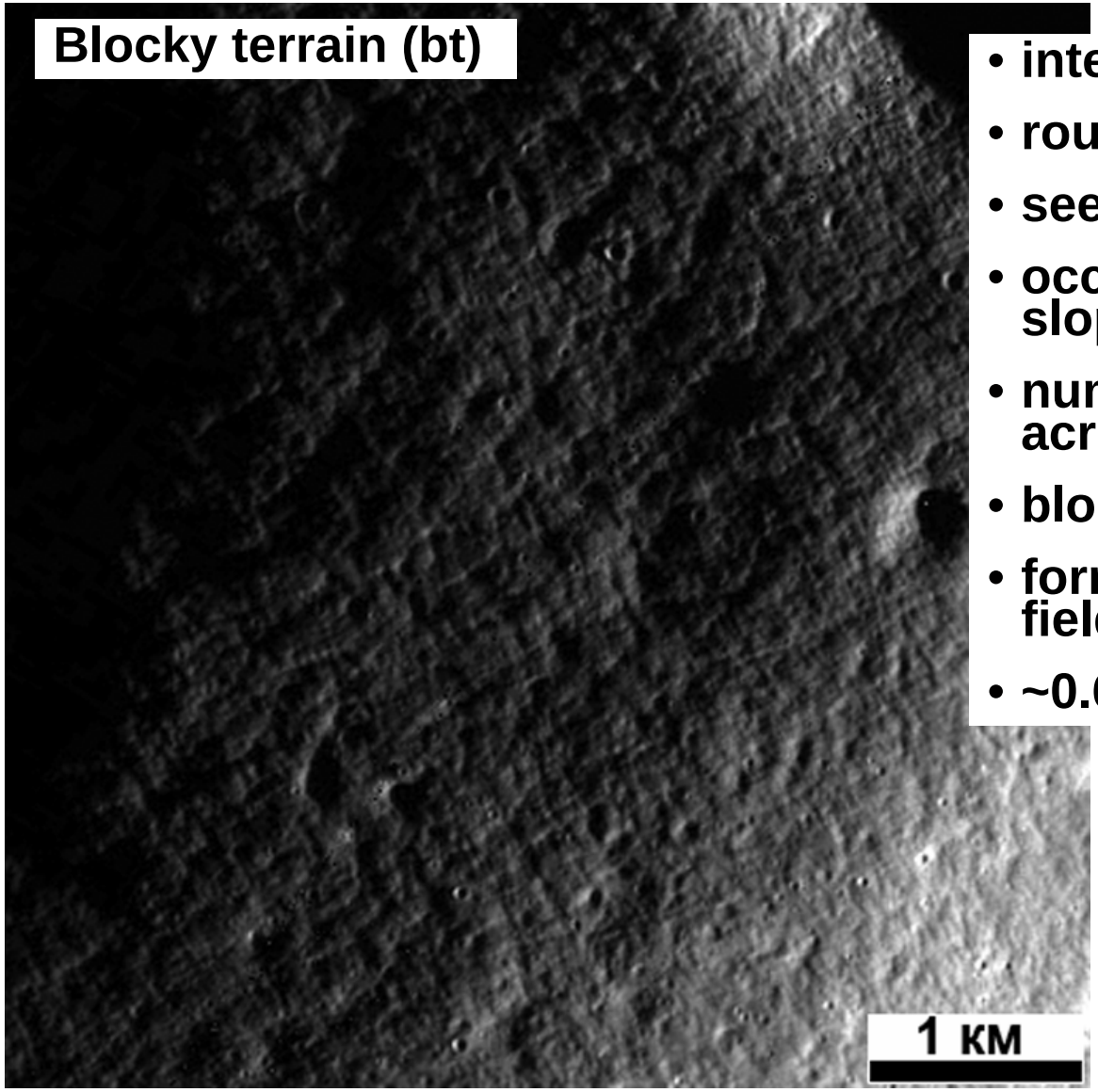
- **interiors of the basin,**
- **undulating surface,**
- **numerous parallel grooves,**
- **different orientation of fields,**
- **occur in regions of lbt and rt,**
- **formed by ejecta from remote craters,**
- **~10% of illuminated area.**

Site East-6: units



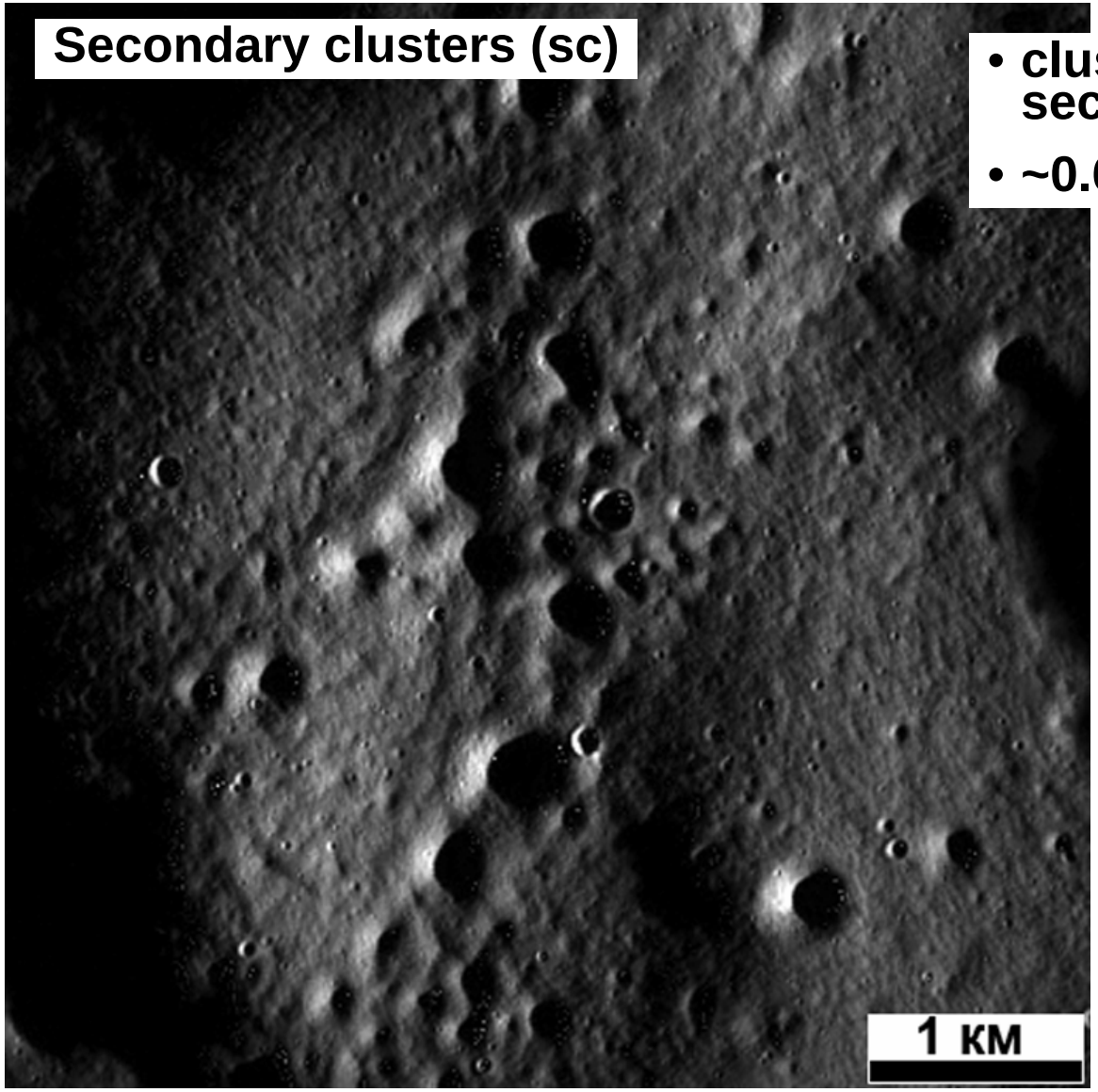
- **interiors of the basin,**
- **undulating surface,**
- **intersecting grooves,**
- **seen at very low Sun,**
- **occur in regions of lbt and rt,**
- **formed by intersection of fields of lineated terrain,**
- **~0.6% of illuminated area.**

Site East-6: units



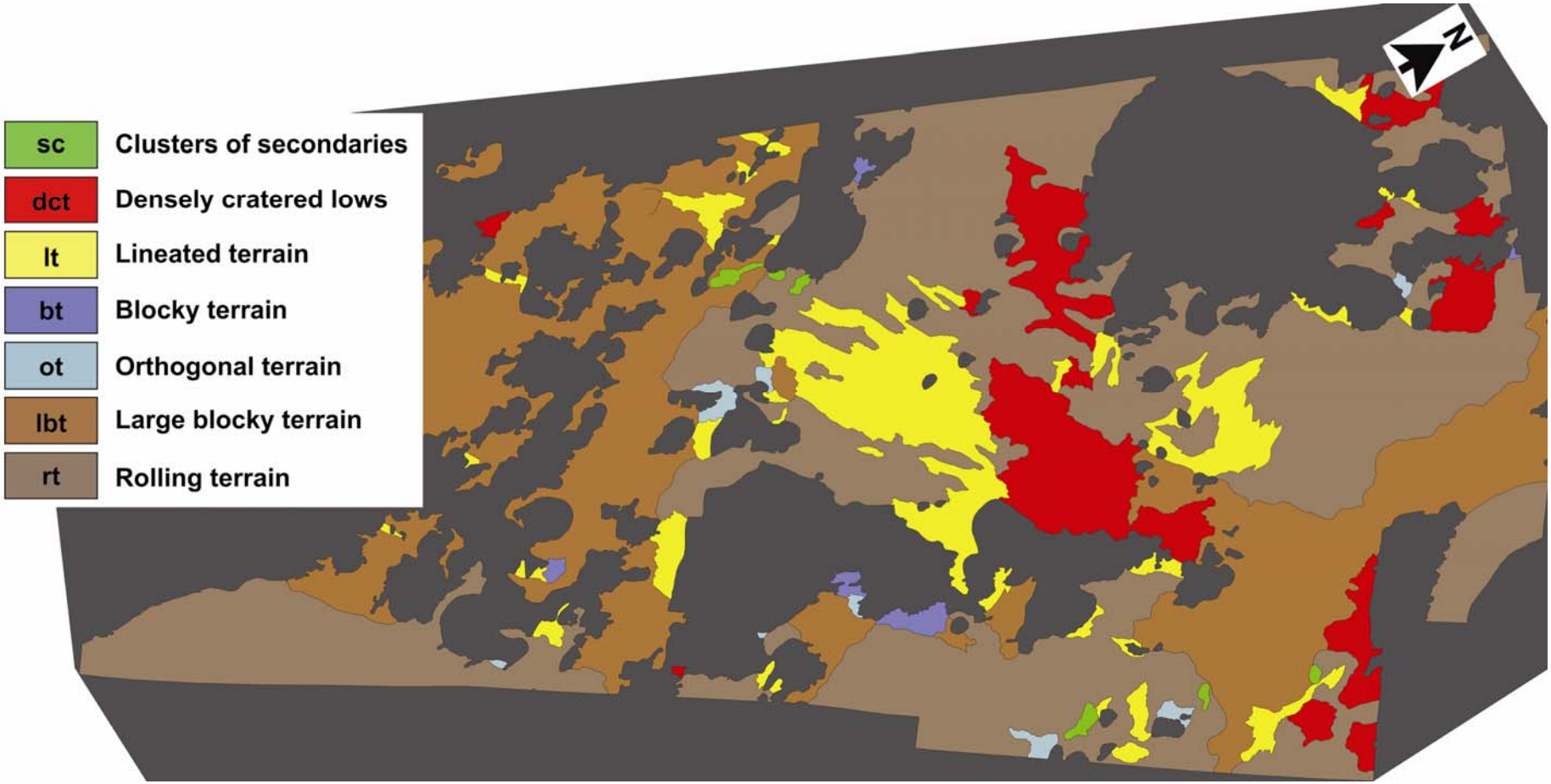
- **interiors of the basin,**
- **rough surface,**
- **seen at very low Sun,**
- **occur at major breaks of slopes in areas of lbt and rt,**
- **numerous blocks (10s m across),**
- **blocks have sharp edges,**
- **formed by intersection of fields of lineated terrain,**
- **~0.6% of illuminated area.**

Site East-6: units



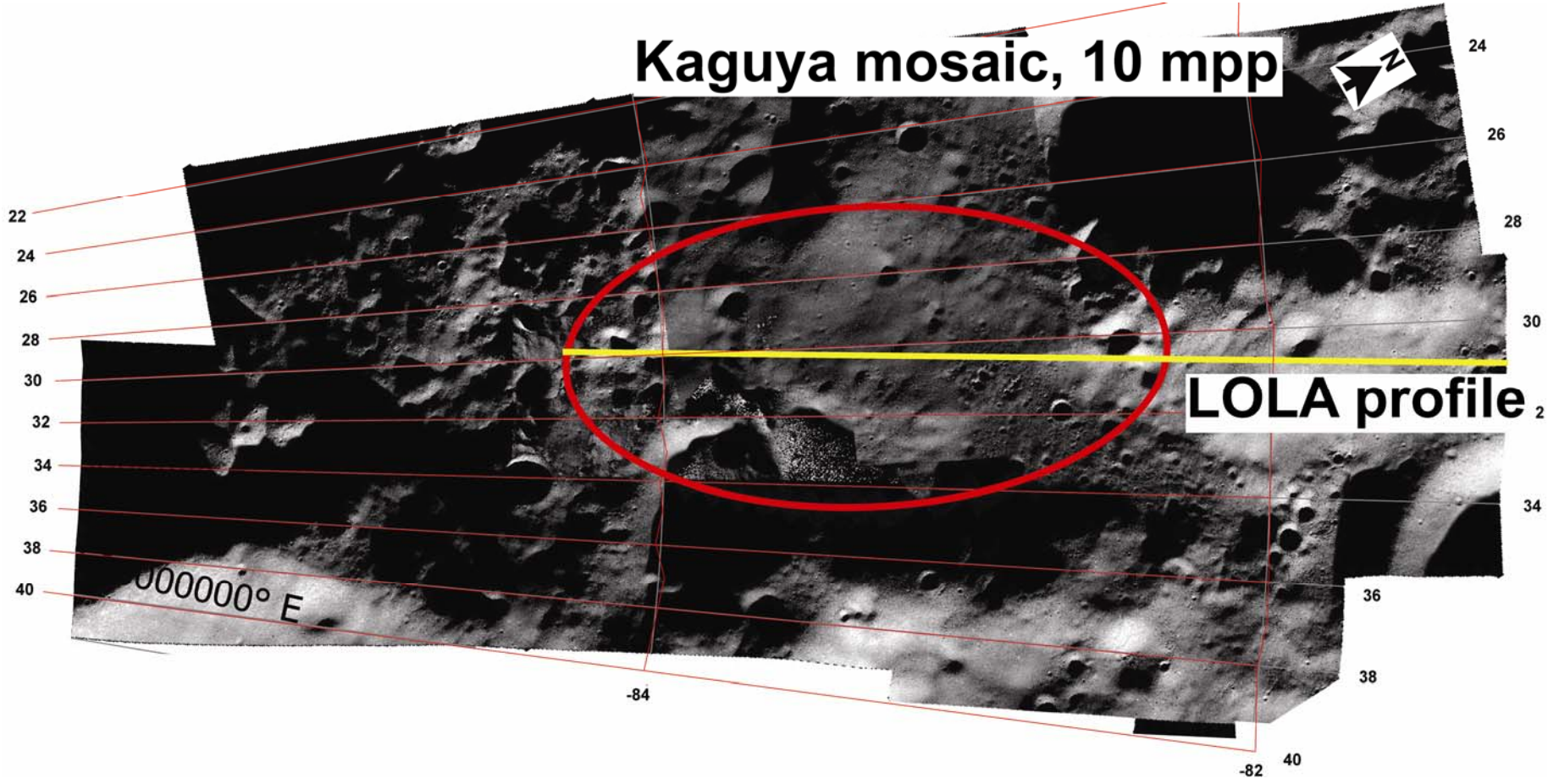
- **clusters of ‘recent’ secondary craters,**
- **~0.6% of illuminated area.**

Site East-6: geological map

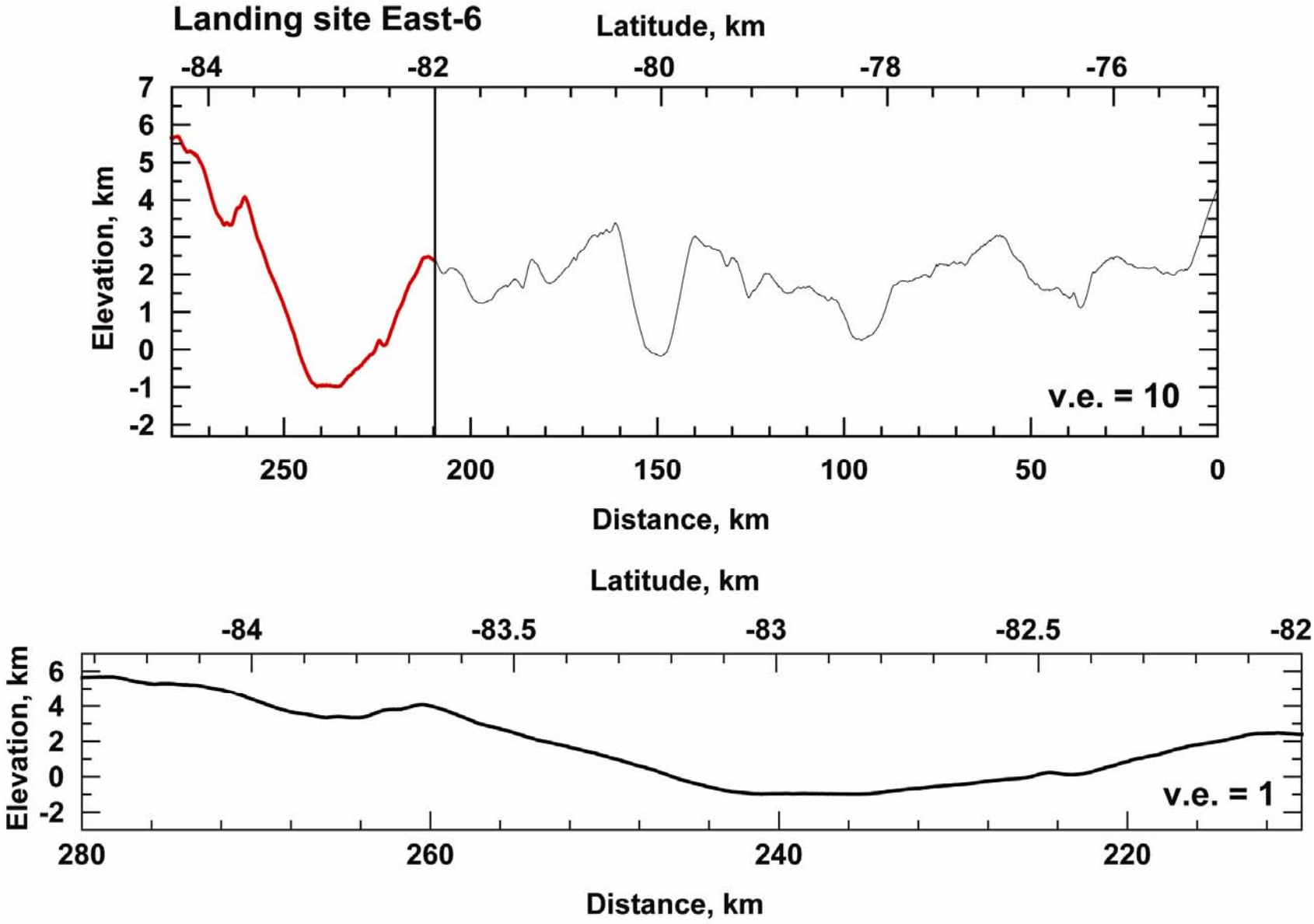


- **lbt occurs in the S (rim of the basin) and N (central massif ?) portions of the site,**
- **rt forms the floor of the basin,**
- **the other units make up the surface of either lbt or rt.**

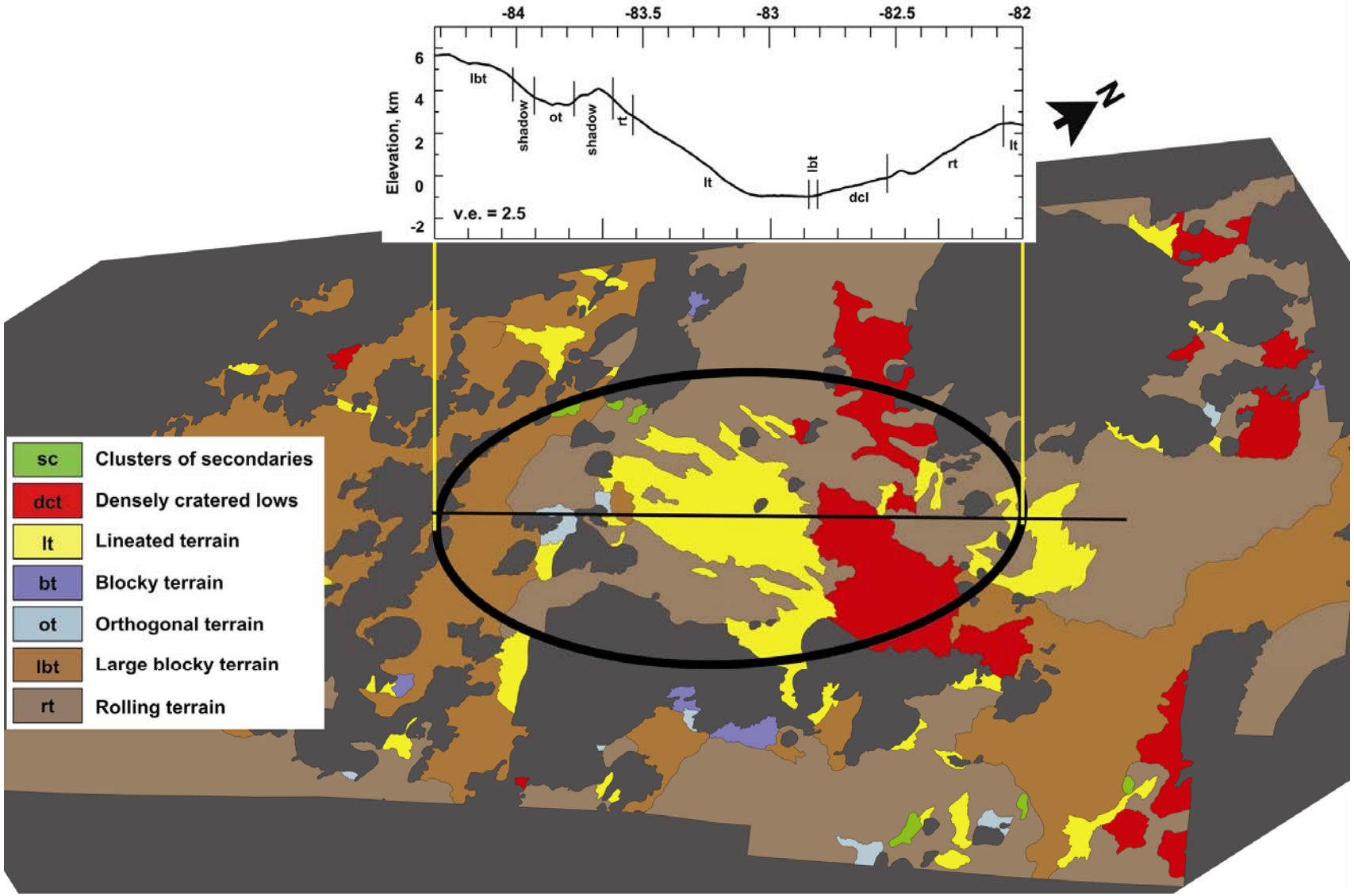
Site East-6: topography



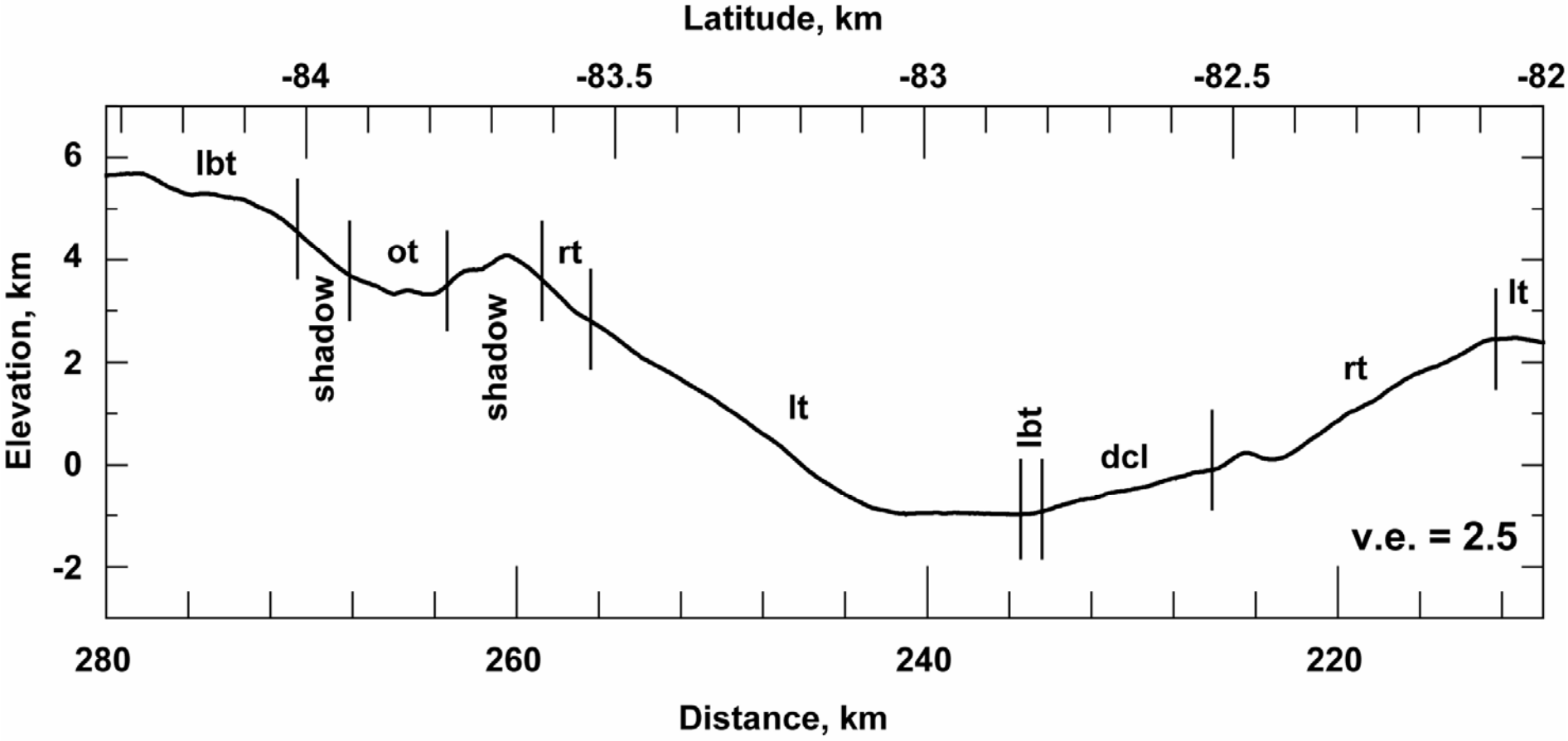
Site East-6: topography



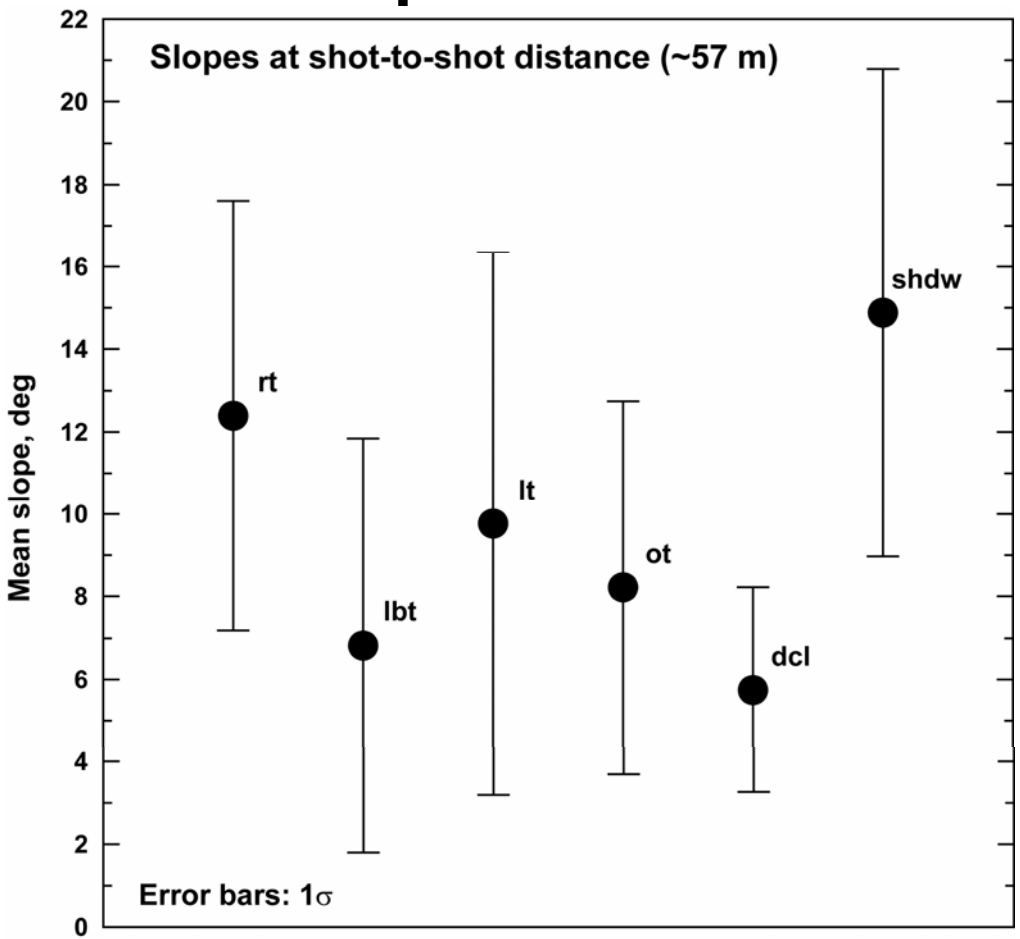
Geology-topography



Geology-topography



Slope characteristics of units

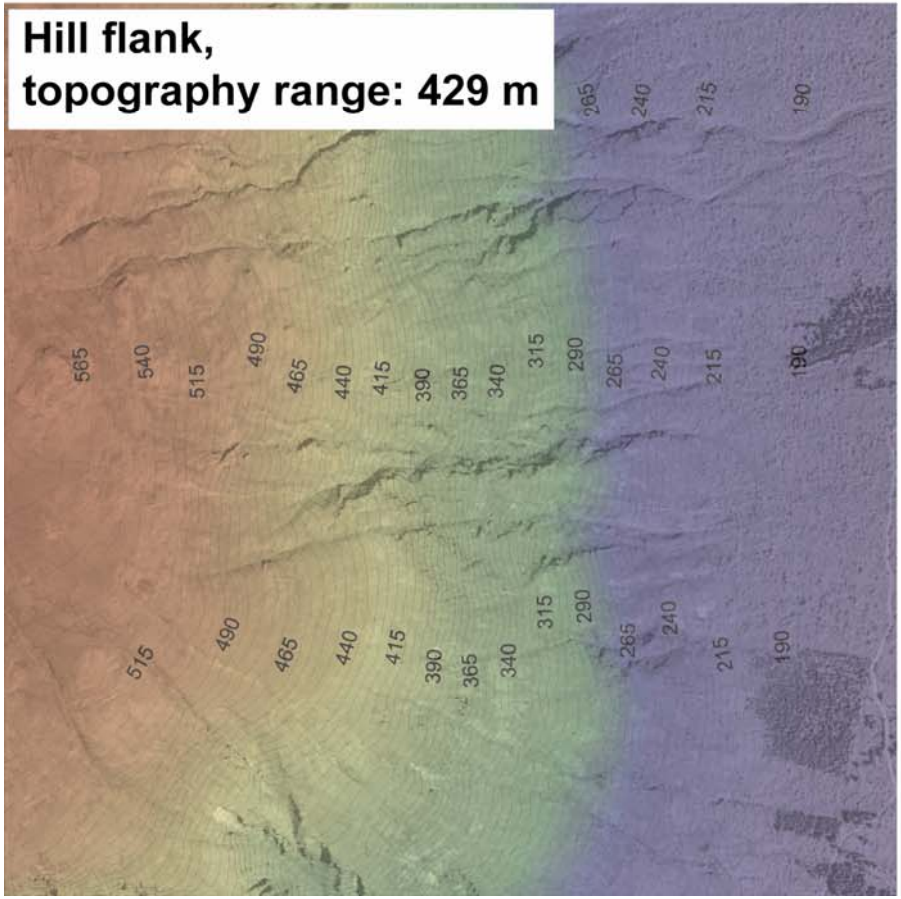


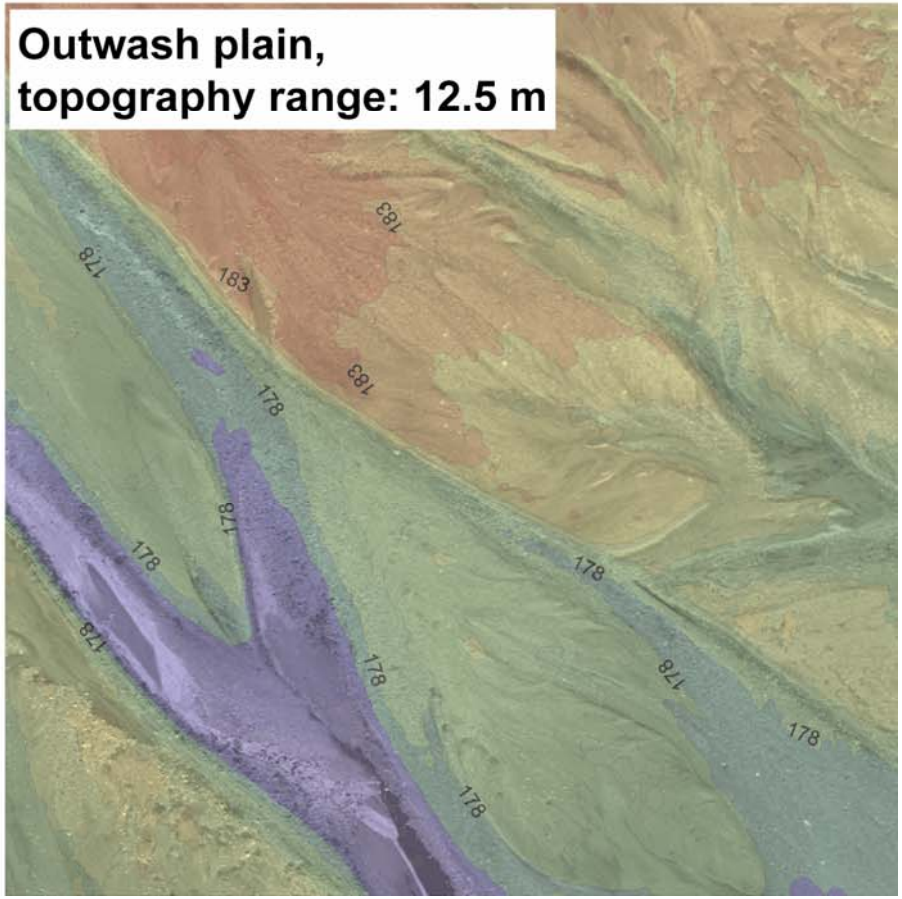
Unit	mean slope, deg	STD, deg
rt	12.4	5.2
lbt	6.8	5.0
lt	9.8	6.6
ot	8.2	4.5
dcl	5.7	2.5
shdw	14.9	5.9

- **the surface of units at the shot-to-shot baseline is rough,**
- **may be even rougher at the lander scale,**
- **landing may be too dangerous,**
- **not the best area due to safety restriction.**

Terrestrial examples

Iceland

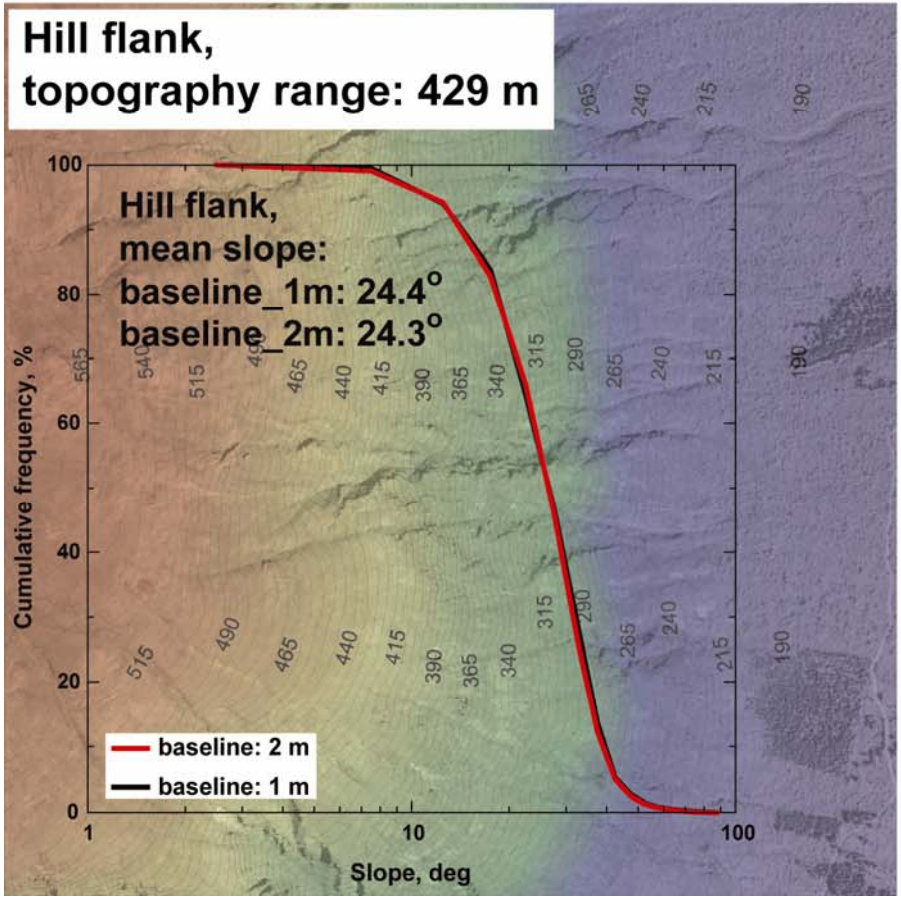


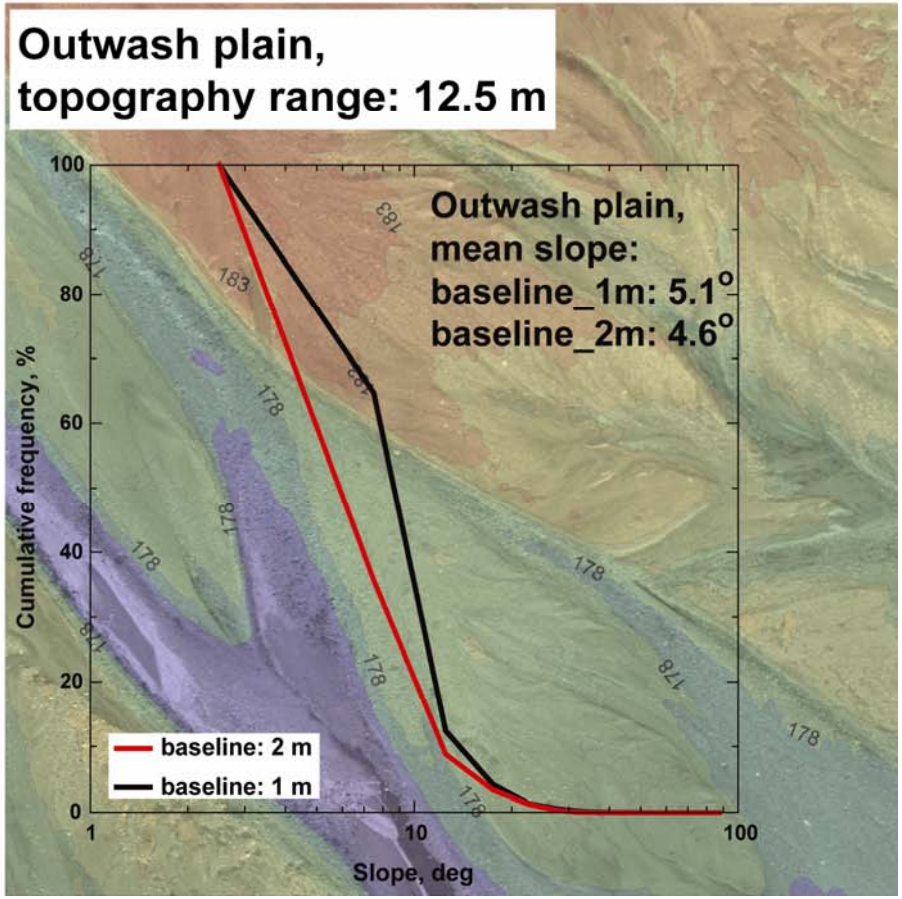


- **long hill flanks: simulate situation at the East-6 landing site,**
- **outwash plains: may simulate flat surfaces on Moon.**

Terrestrial examples

Iceland





- **long-wavelength topography controls the small-scale roughness,**
- **long, steady slopes: slopes at different bases vary insignificantly,**
- **flattened areas: variations of slopes at different bases are larger.**