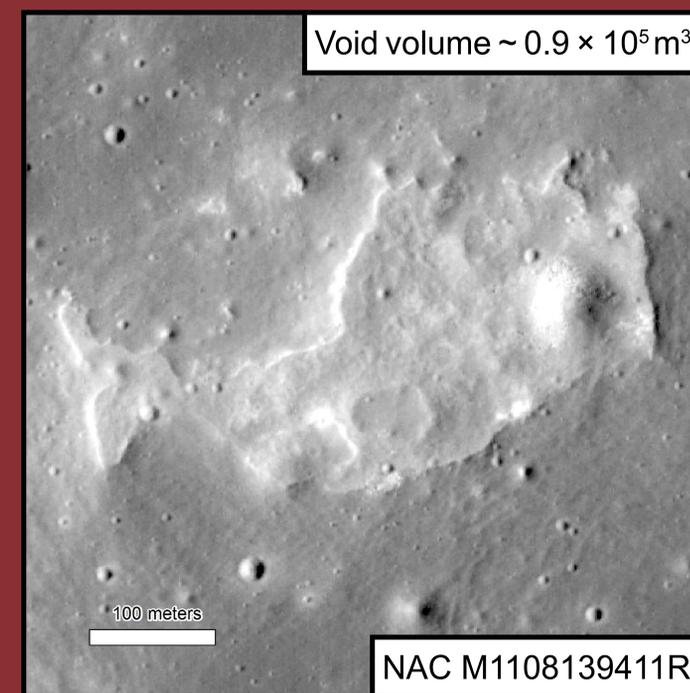
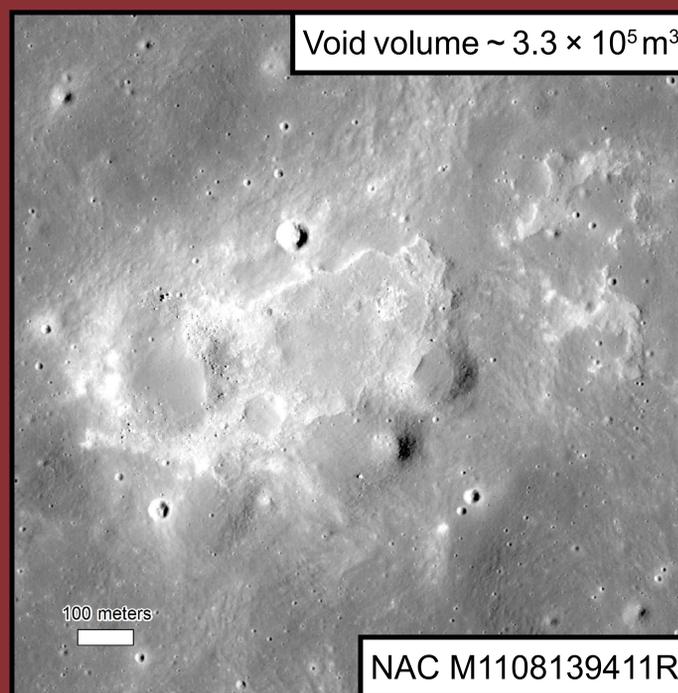
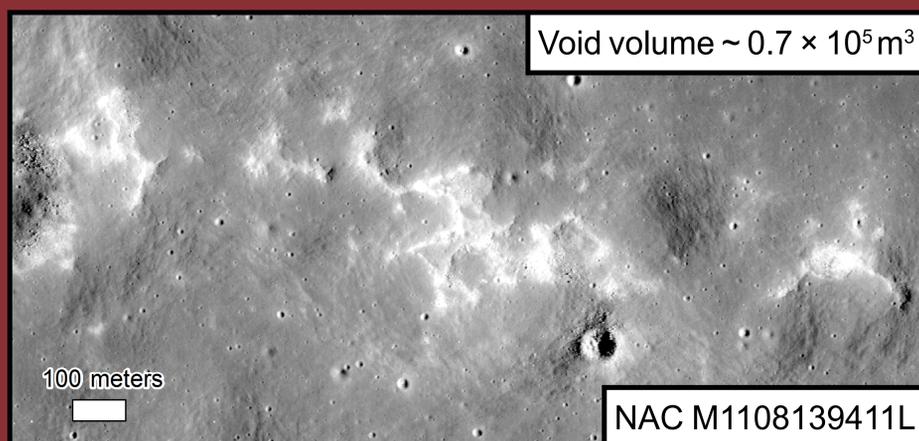
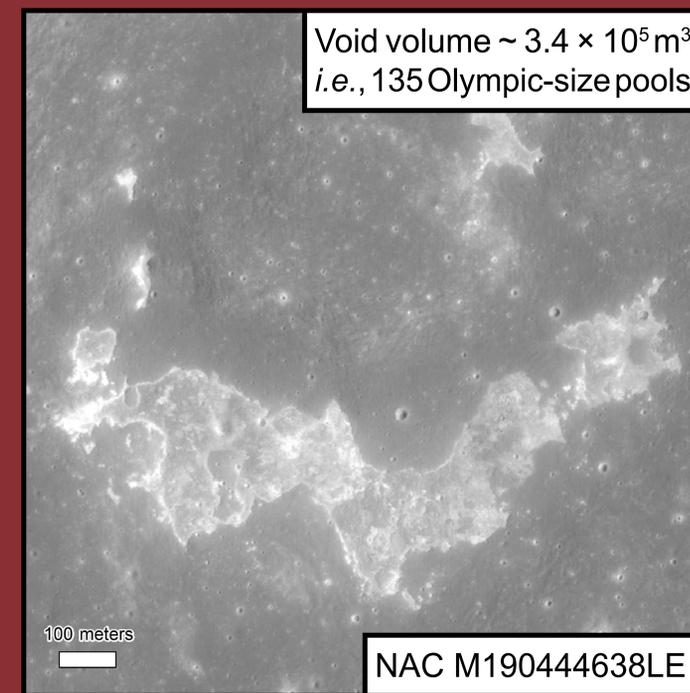
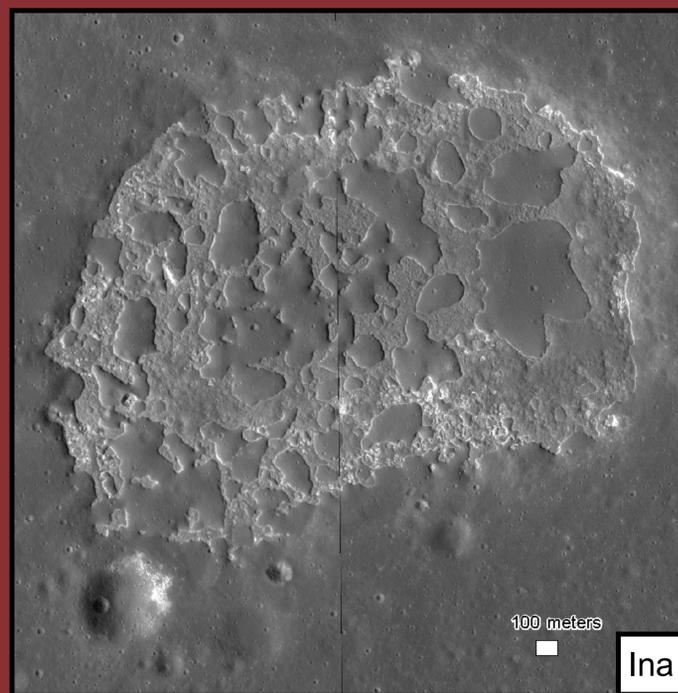


Lunar Ina-like features: Maps and morphometry

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Introduction: What process formed the lunar feature Ina, an approximately rectangular (D-shaped) 2 km by 3 km pit about 50 m deep with low mounds rising from its bright, bouldery floor (at right)? Perhaps Ina represents a caldera [1], a field of inflated lava flows [2], or the scar left behind by a massive gas explosion [3]. None of these explanations is entirely consistent with observations of Ina: if Ina is an ancient caldera, why are its surfaces bouldery, fresh, and spectrally immature [3]? If Ina's floor and mounds formed due to recent volcanism, why does that floor depart from an equipotential surface, and why are its mounds so much older (*i.e.*, more heavily cratered and spectrally mature) than its floor? If Ina is an explosion crater, where is its young, spectrally immature ejecta? As an alternative, we have suggested that Ina formed (and is forming) by ongoing ground collapse into a porous subsurface [4], perhaps into large aggregated vesicles or voids in a ~ 1 Gya lava flow unit. **How can these formation hypotheses for Ina be tested?**



Ina-like features: *Ina is not alone.* High-resolution LROC NAC imagery reveals dozens of pits resembling Ina in form (though in every case smaller and shallower), with sharp cusped or lobate walls surrounding a bright, bouldery floor up to 10 m below adjacent regolith. Low, irregular mounds rise from these bouldery floors. These pits, which we call "Ina-like features", often cluster at local and regional scales to form complexes of pits, and are associated with volcanic-tectonic features such as graben. Stooke [5] and Braden [6] have previously mapped and described Ina-like features.

We have independently identified ~ 30 Ina-like features in NW Mare Tranquilitatis. We have mapped the largest of these features and characterized their morphometry (area, depth, volume) using photoclinometry, and documented their geological associations. **This poster shows six Ina-like features in Mare Tranquilitatis.** Widespread similarities between Ina and Ina-like features point to a similar process of formation.

References: [1] Strain, P. L. and F. El-Baz (1980), Proc. Lunar Planet. Sci, 11. [2] Garry, W. B. et al. (2012), JGR, 117. [3] Schultz, P. H. et al. (2006), Nature, 444. [4] Vaughan, W. M. and J. W. Head (2012), Lunar Sci. Forum. [5] Stooke, P. J. (2012) LPSC, abstract 1011. [6] Braden, S. E. et al. (2013) LPSC, abstract 2843.

