

TECTONICS OF THE MOON

New Views of the Moon 2, expected pub. date 2019

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1. Summary/abstract ([All](#))
2. Introduction and motivation ([Johnson/All](#))
 - 2.1. Purpose of this chapter
 - 2.1.1. Overall theme: “What tectonic landforms reveal about the Moon’s origin, evolution, and recent activity,” relation to other NVM2 chapters, Planetary Tectonics chapter
 - 2.2. What can we learn about lunar evolution from tectonic structures (briefly)?
 - 2.2.1. Evolution of stresses (basin localized and global)
 - 2.2.2. Current stress state of the Moon
 - 2.2.3. Constrain models for early lunar history (totally molten Moon, magma ocean) and subsequent thermal evolution, sources for stresses resulting in tectonism
3. Tectonic structures of the Moon ([Nahm](#), [Watters](#), [Banks](#))
 - 3.1. Brief description of new global data sets (since 2006)
 - 3.1.1. LRO: LROC and LOLA
 - 3.1.2. SELENE/Kaguya: TC and LALT
 - 3.1.3. GRAIL
 - 3.2. Global distribution of tectonic structures + maps (here discussion of basin localized vs. global can be discussed/introduced)
 - 3.3. Morphology and subsurface geometry of tectonic structures
 - 3.3.1. Graben ([Nahm](#))
 - 3.3.1.1. Large scale
 - 3.3.1.2. Small scale
 - 3.3.2. Wrinkle ridges ([Watters](#))
 - 3.3.3. Lobate scarps ([Watters and Banks](#))
 - 3.4. Structures without surface expressions
 - 3.4.1. Deep-seated graben from GRAIL ([Jeff Andrews-Hanna](#))
 - 3.4.2. Deep basin structures
 - 3.4.3. Ancient graben (Sawada et al., 2016)
 - 3.5. Hypothesized formation mechanisms (right now, no particular order)
 - 3.5.1. Basin-localized tectonics/mascon tectonics
 - 3.5.2. Impacts
 - 3.5.3. Dikes
 - 3.5.4. Magmatic intrusions
 - 3.5.5. Tidal stresses
 - 3.5.6. Global stresses (contraction, despinning)
 - 3.5.7. Others?
4. Lunar seismicity ([Johnson](#), [Weber](#), [Watters](#))
 - 4.1. Brief summary of seismicity/historical seismic data
 - 4.2. Relationship to tectonic structures, if any
 - 4.2.1. New work from Weber et al for lobate scarps

- 4.2.2. Deep vs. shallow (deep: mention here, but refer to interior chapter)
- 4.3. Activity predictions/assessment
 - 4.3.1. Observations of boulder falls potentially triggered by quakes (Kumar et al., JGR, 2015)
 - 4.3.2. Paper describing lobate scarps, moonquakes, current stress state (Watters et al., in prep)
- 4.4. Calculations of moonquake size for different structure types?
- 5. Timing of tectonic structure formation (Nahm, Watters, Banks, van der Bogert)
 - 5.1. Relative ages of structures
 - 5.2. Absolute ages from crater counting, where applicable
 - 5.2.1. Lobate scarps (van der Bogert)
 - 5.2.2. Dike-related large-scale graben (Nahm)
 - 5.3. Discussion of recent tectonic activity (from work by N. Williams, R. French, van der Bogert, others studying lobate scarps)
 - 5.4. Implications for types and timing of stress sources?
- 6. Implications for global/regional evolution models (synthesis section?) (McGovern, Johnson, Watters)
 - 6.1. Mascon tectonic models
 - 6.2. Tidal stresses
 - 6.3. Global contraction/interior cooling
 - 6.4. Polar wander
 - 6.5. Early despinning
 - 6.6. Others?
- 7. Conclusions, synthesis, outstanding questions (All)

Figure types + section location (tentative)

- Global map(s) of tectonic structures (all on one map? How should we deal with maps from different groups?) [3.2]
- Image(s) of each major tectonic structure group [3.3]
- Stress predictions from different models – timing, magnitude etc., c.f. observational constraints [4, 6]

Supplementary data for online repository

- GIS-compatible files for all global maps