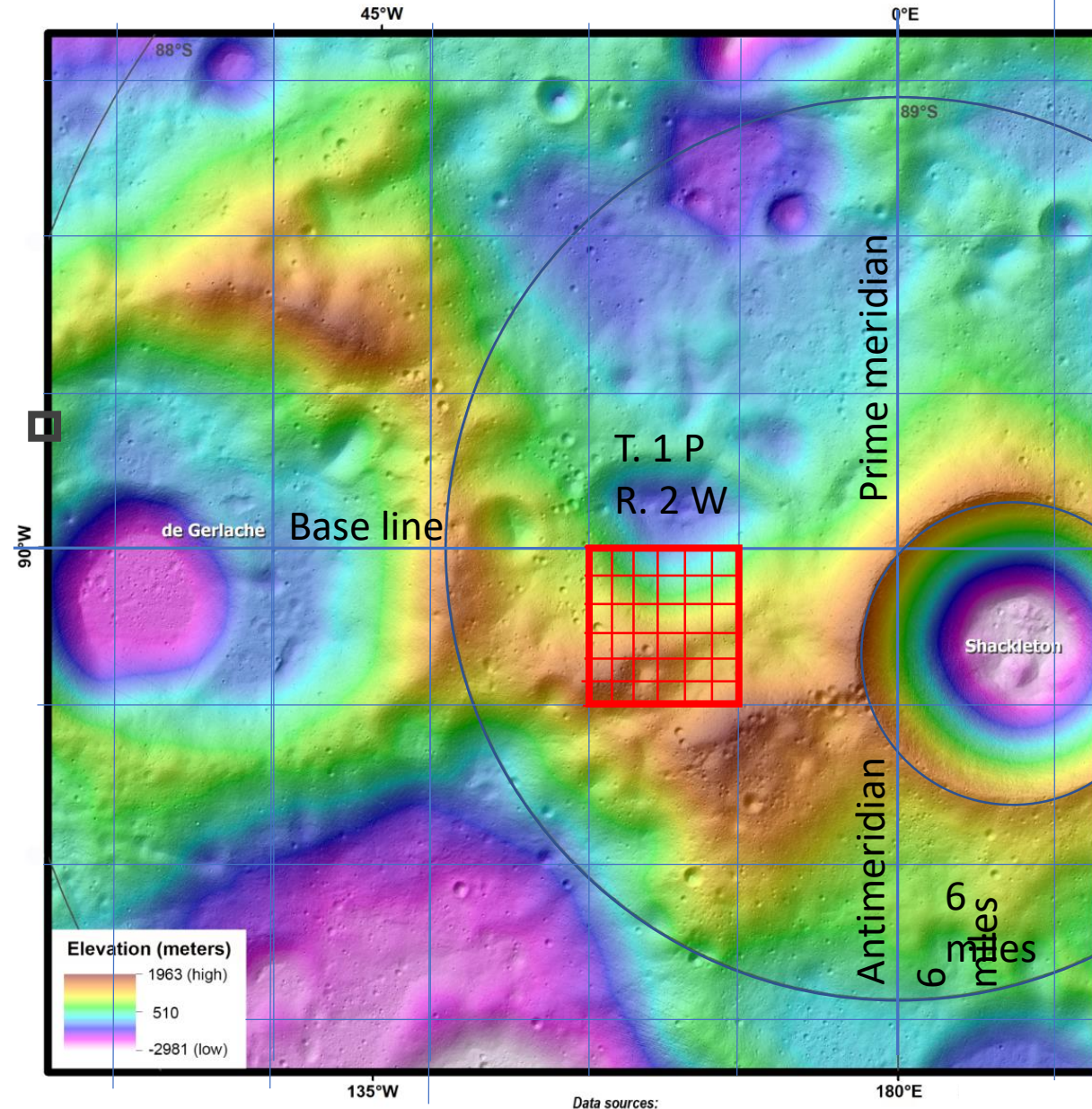


Land Survey Systems for the Moon

Adrian Stoica



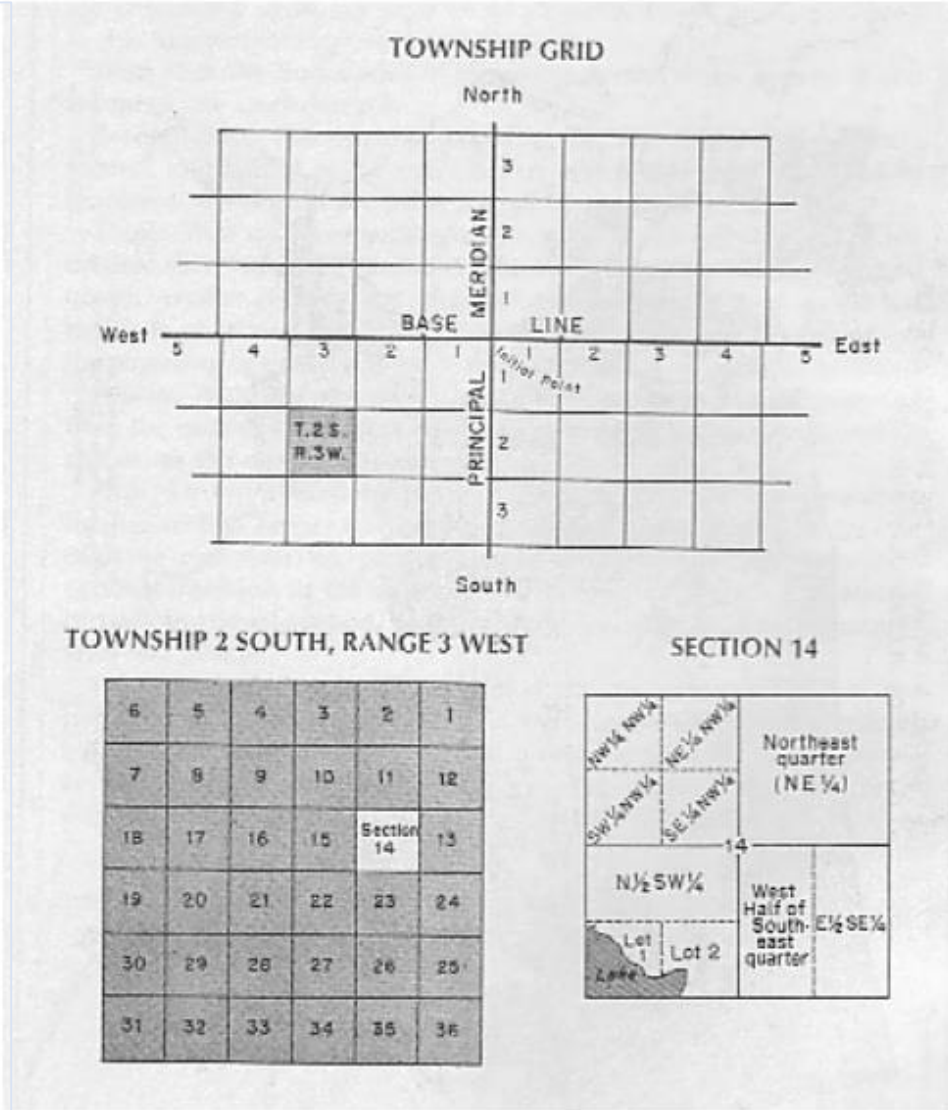
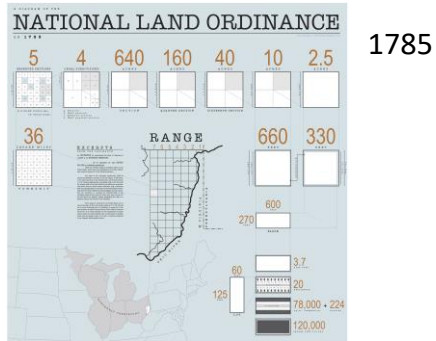
Objective: introduce lunar survey systems that may be relevant for land allocation purposes in the context of a lunar economy.

Public Land Survey System (The US Rectangular System)

GENERALIZED DIAGRAM OF THE RECTANGULAR SYSTEM OF SURVEYS

The **Public Land Survey System** (PLSS) is the [surveying](#) method developed and used in the [United States](#) to [plat](#), or divide, [real property](#) for sale and settling.

- “Township” (note dual meaning) is the 6 miles square@ intersection of Tlines and Rlines
- A township, unit of survey, has 36 sections, one-mile square each
- Each section has 640 acres
- Under the general land laws, the unit of administration is the quarter-quarter section of nominally 40 acres or the lot, either of which is often referred to as the smallest legal subdivision.
- Under mining and reclamation laws, the smallest legal subdivision is the quarter-quarter-quarter section of 10 acres.
- Provisions to handle the corrections as the rectangles become in fact trapezoids.

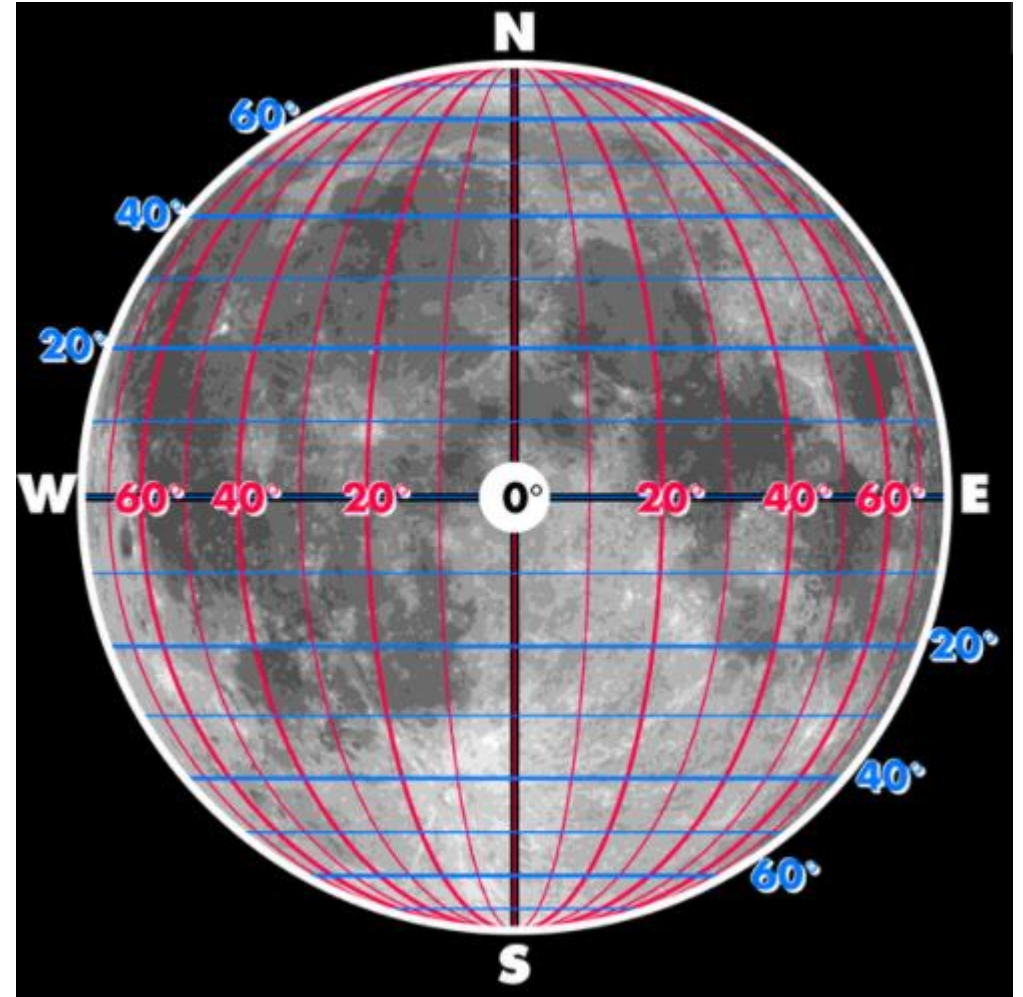


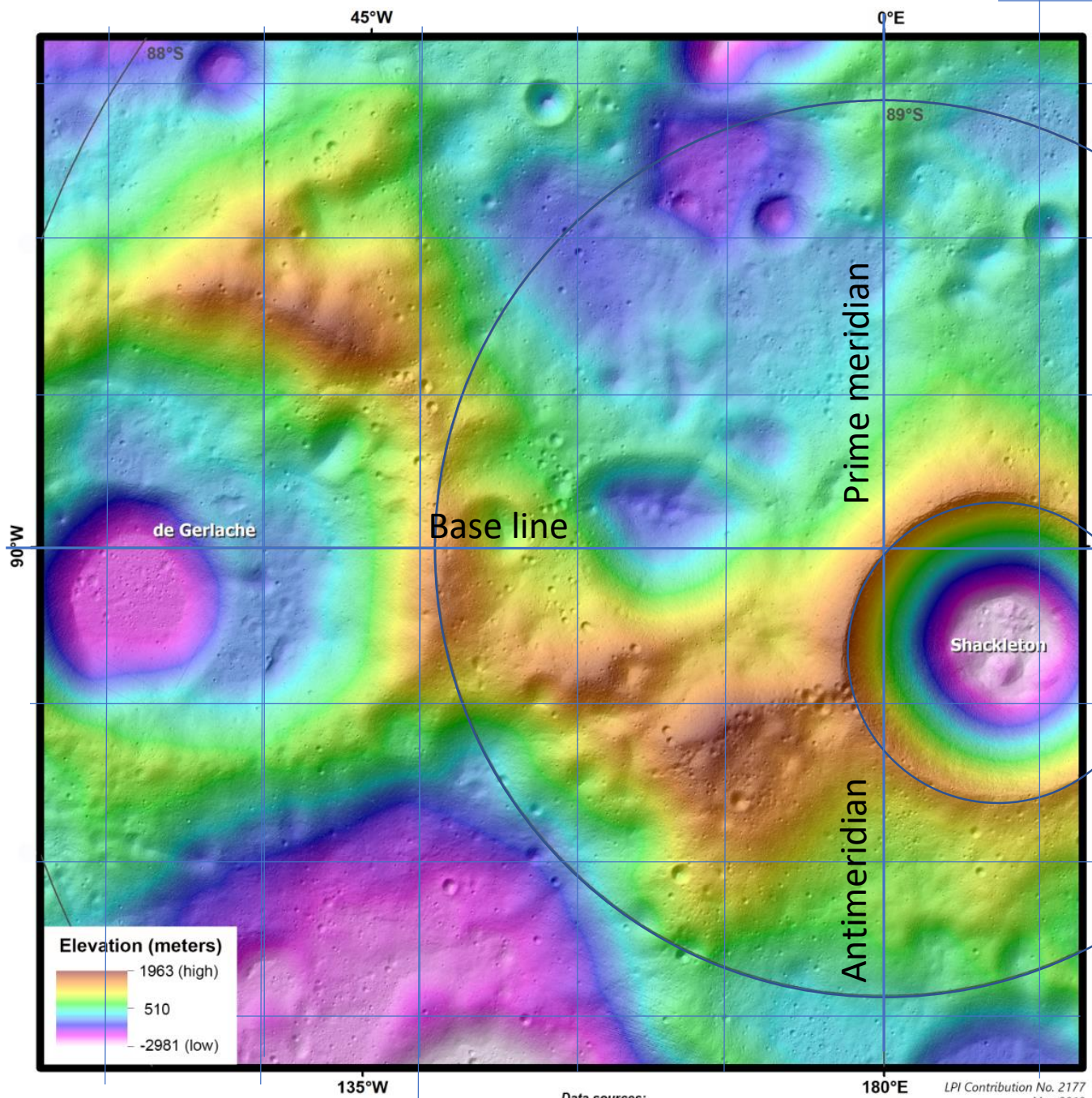
The rectangular survey system:

- Based upon true meridian
- Originates from an “Initial Point” (IP)
- North-south line through IP, “Principal Meridian”.
- East-west line through the IP parallel to the equator, “Base Line”.
- Township Lines every 6 miles N and S
- Range Lines every 6 miles E and W.

Selenographic coordinates

- The longitude gives the position east or west of the Moon's **prime meridian**, which is the line passing from the [lunar north pole](#) through the point on the lunar surface directly facing Earth to the [lunar south pole](#)





Proposed Rectangular System applied to Lunar Polar Area Here for the South Pole

Defining:

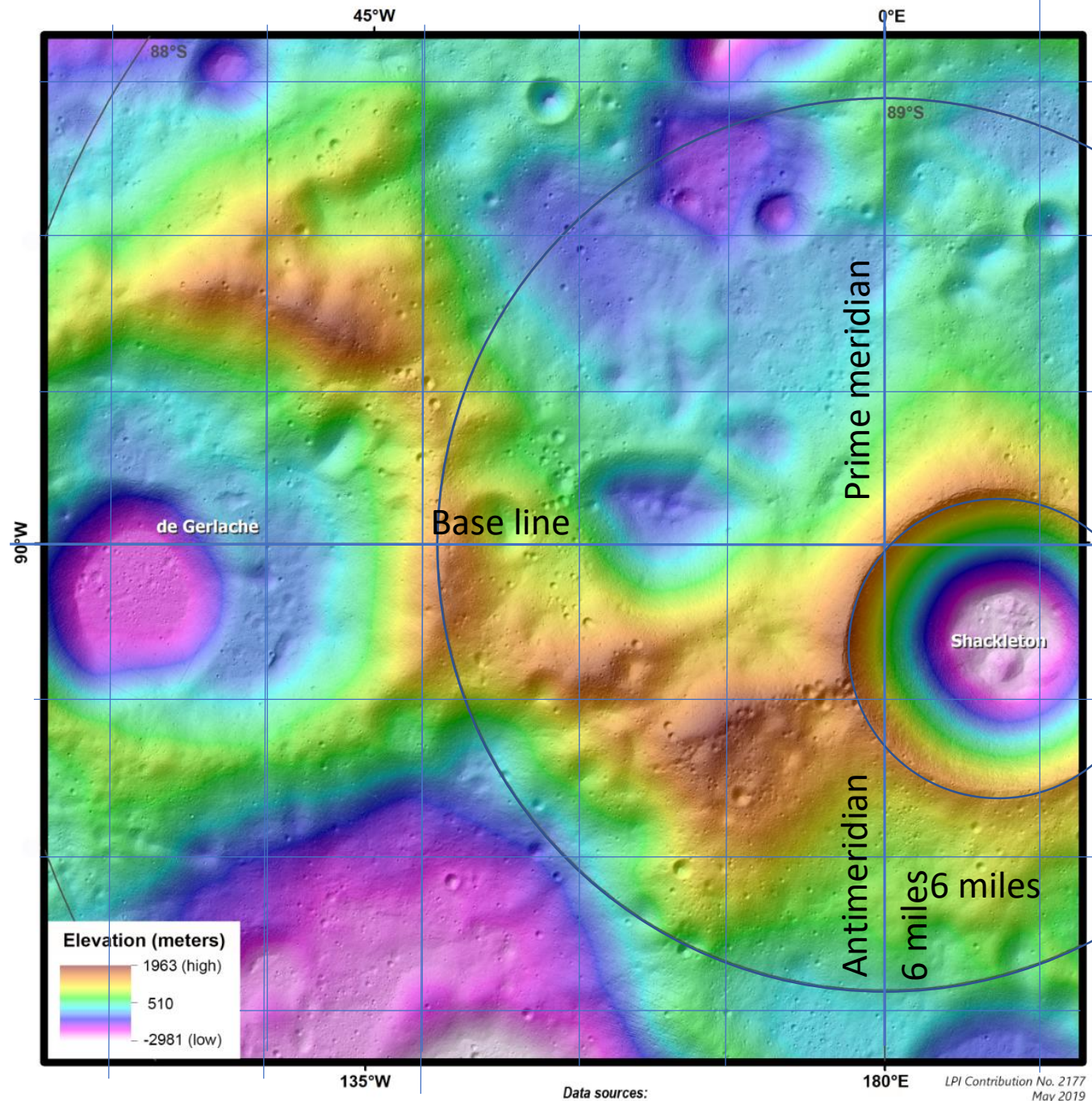
- “Initial Point” is South Pole
- “**Principal Meridian**” is the “North-south” line through IP, technically speaking lunar Prime Meridian and Antemeridian (180th meridian) *We will refer to it as Shackleton Meridian*
- “**Base Line**” ‘East-west’ line through the IP parallel NOT to the Equator as on Earth *but with 90E Meridian and 90W Meridian*
- *We will refer to it as Shackleton Baseline*

Superimposed on Topographic Map of the Moon’s South Polar Ridge

Data sources:

LPI Contribution No. 2177
May 2019

Polarstereographic Projection (scale true at pole)
Scale: 1:300,000



Proposed Rectangular System
 applied to Lunar Polar Area
 Here for the South Pole

US/imperial system

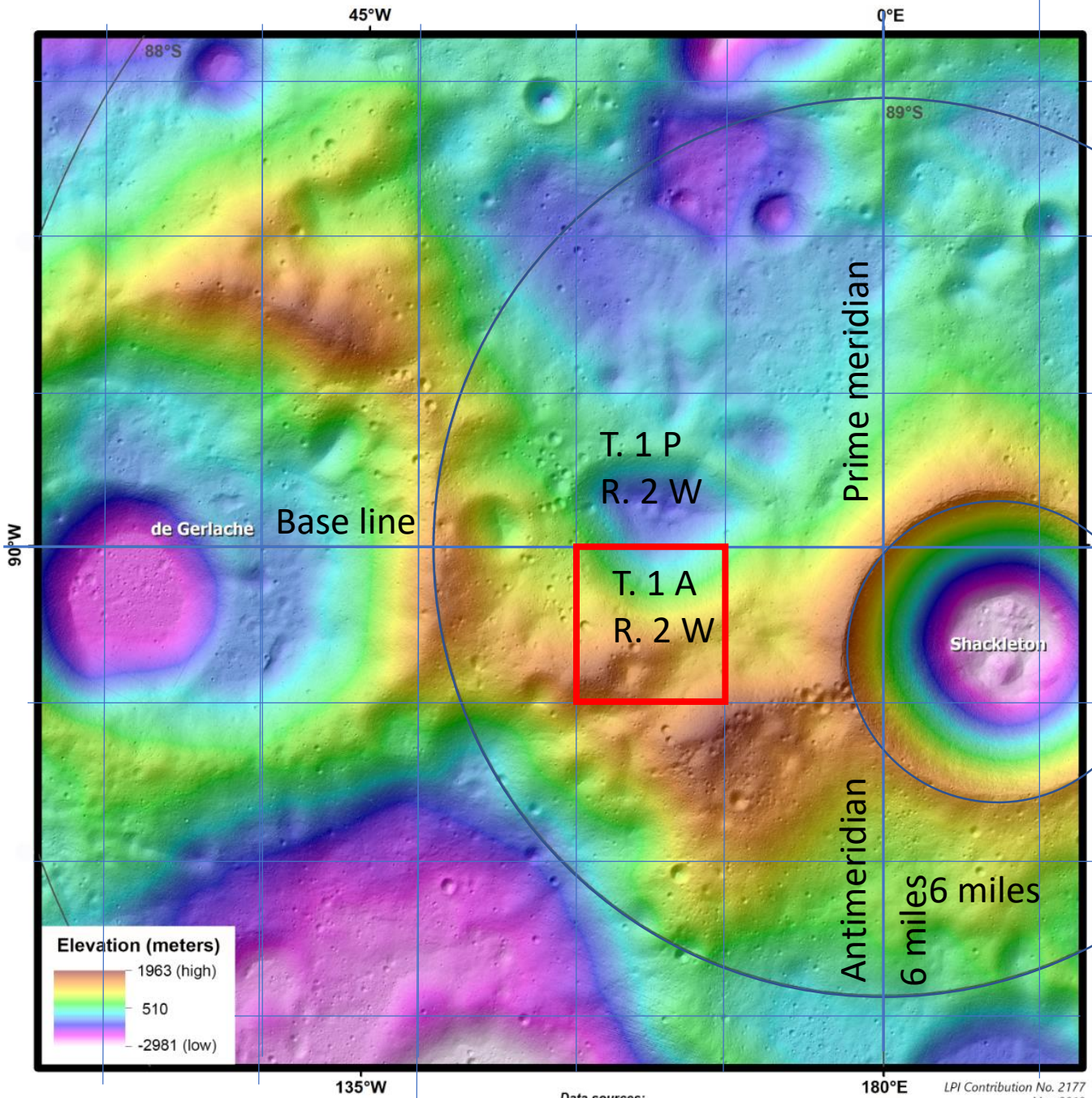
- “Initial Point” is SP
- Principal Meridian (PM):
 Prime Meridian (PM) 0E
 Meridian and AntiMeridian
 (AM)180E Meridian
- Base Line: 90E Meridian 90W
 Meridian
- **Shackleton Meridian and
 Shackleton BaseLine**
- Township* Lines every 6 miles
 in P(M) direction and A(M)
 direction
- Range* Lines every 6 miles E
 and W.

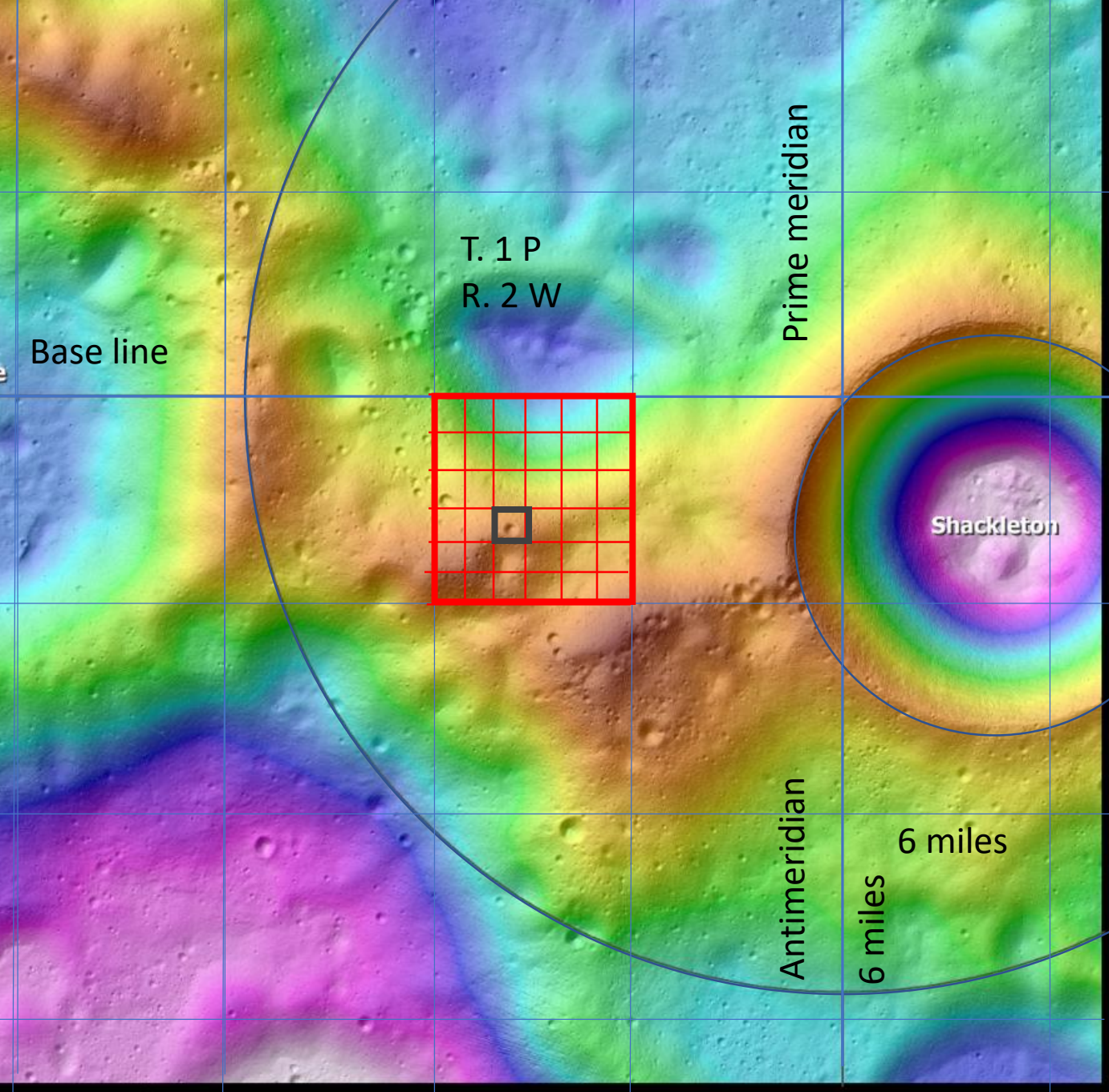
* Better names needed

Proposed Rectangular System
 applied to Lunar Polar Area
 Here for the South Pole

US/imperial system

- "Initial Point" is SP
- Principal Meridian (PM): Prime Meridian (PM) 0E Meridian and AntiMeridian (AM)180E Meridian
- Base Line: 90E Meridian 90W Meridian
- Township* Lines every 6 miles in P(M) direction and A(M) direction
- Range* Lines every 6 miles E and W.
- *Better names needed
- Thus 1 township in the A direction and 2 ranges in W direction define the township marked with red square: 36 square miles



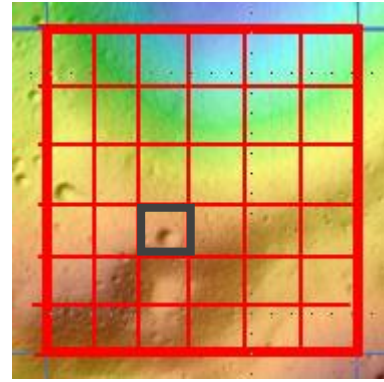


Proposed Rectangular System applied to Lunar Polar Area
Here for the South Pole Imperial system

T 1 A
R 2 W

**Sections inside T.1A R.2W,
1 mile x 1 mile each**

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15		13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36



**Thus the crater is
Meridian: South Pole (or Shackleton Meridian)
Township T.1A
Range R.2W
Section Sec. 21**

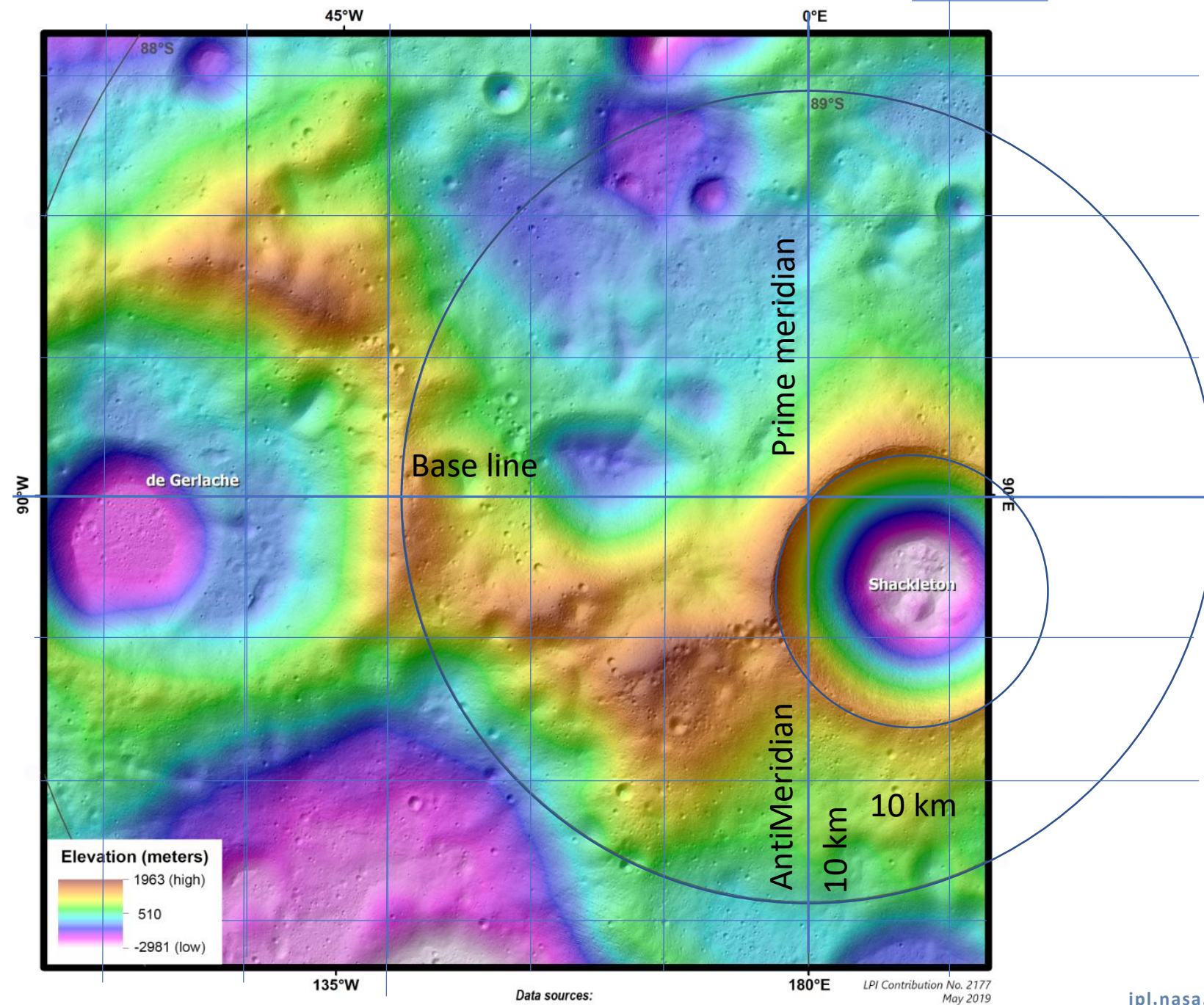
135°W

Data sources:

180°E

LPI Contribution No. 2177
May 2019

jpl.nasa.gov



Proposed Rectangular System applied to Lunar Polar Area Here for the South Pole

SI Version (international system)

- "Initial Point" is SP
- Principal Meridian (PM): Prime Meridian (PM) 0E Meridian and AntiMeridian (AM) 180E Meridian
- Base Line: 90E Meridian 90W Meridian
- Township* Lines **every 10 km** in P(M) direction and A(M) direction
- Range* Lines every **10 km** E and W.
- Divide in 100 **one kilometer square sections.**
- Each 1 km square section divided in **100 plots of 1 ha.**

* Better names needed

Data sources:

LPI Contribution No. 2177
May 2019

Summary

A lunar survey system was introduced, which may be relevant for land allocation purposes in the context of a lunar economy. Operational plots could be easily referred in a simplified way, similar to how it is done on Earth.