

Supplementary Figures

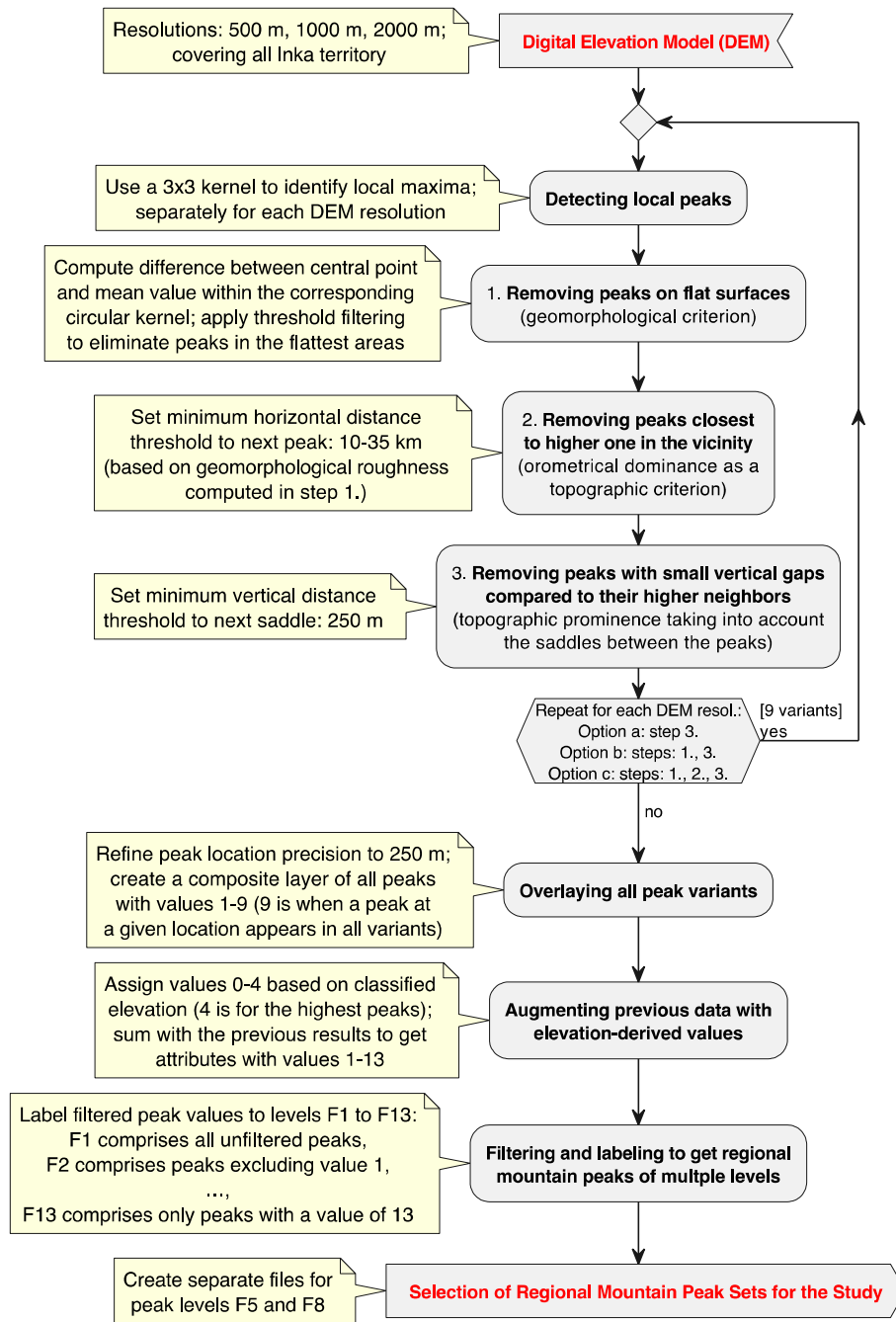


Figure S1. Peak Mapper Algorithm Flowchart. This flowchart illustrates the operational sequence of the Peak Mapper software designed for the detection, filtering, and labeling of mountain peaks. The process begins with the input of topographical data, followed by the initial peak detection phase where potential peak points are identified based on elevation criteria. Subsequent to detection, a filtering algorithm is applied to remove noise and non-peak artifacts. The remaining points undergo a verification process, ensuring that only true peaks are retained. The final phase involves the labeling of these verified peaks with appropriate nomenclature and categorization by prominence and elevation into 13 levels mountain peak sets. Key decision points and algorithmic loops are clearly illustrated, demonstrating the iterative nature of peak refinement in the system.

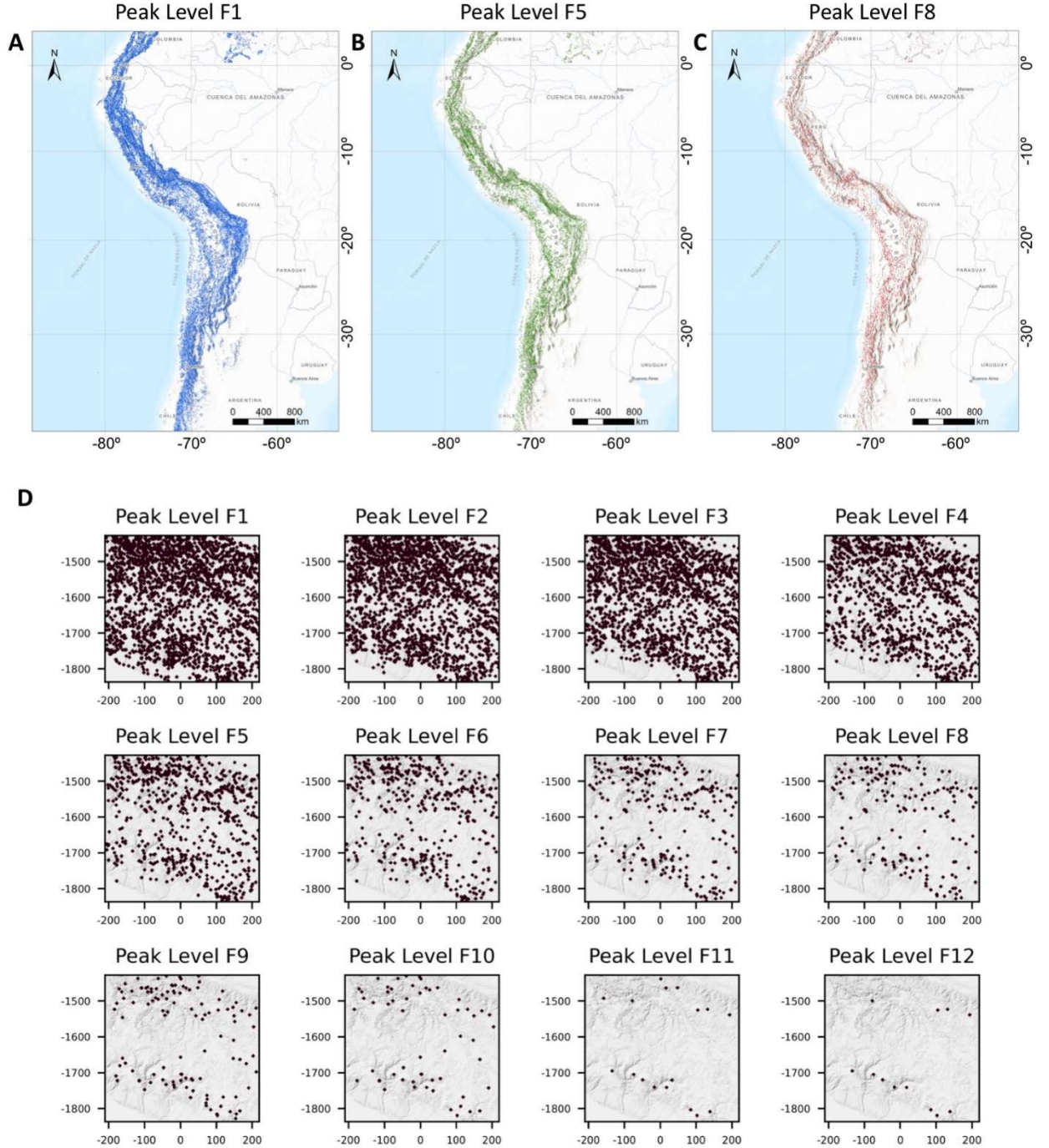


Figure S2. Maps Illustrating the Distribution of Identified Mountain Peaks Across Various Levels of Filtering. A-C) Detected mountain peaks on Inka region at Peak Level F1 (A), F5 (B), and F8 (C). D) Detected mountain peaks on Area #5 Cusco. Levels of peak filtering are shown from F1–F12. Graticule numbers are in km. Peak Level 13 is not shown because, in this selected area, only one peak is left. Peak levels (1–3) are categorized as local, merely prominent; (4–10) as regional, dominant and prominent; and (11–13) global, remarkably dominant over the others. The positional resolution of these peaks is set at 250 m, consistent with that of the GMTED DEM, in the Cassini map projection.

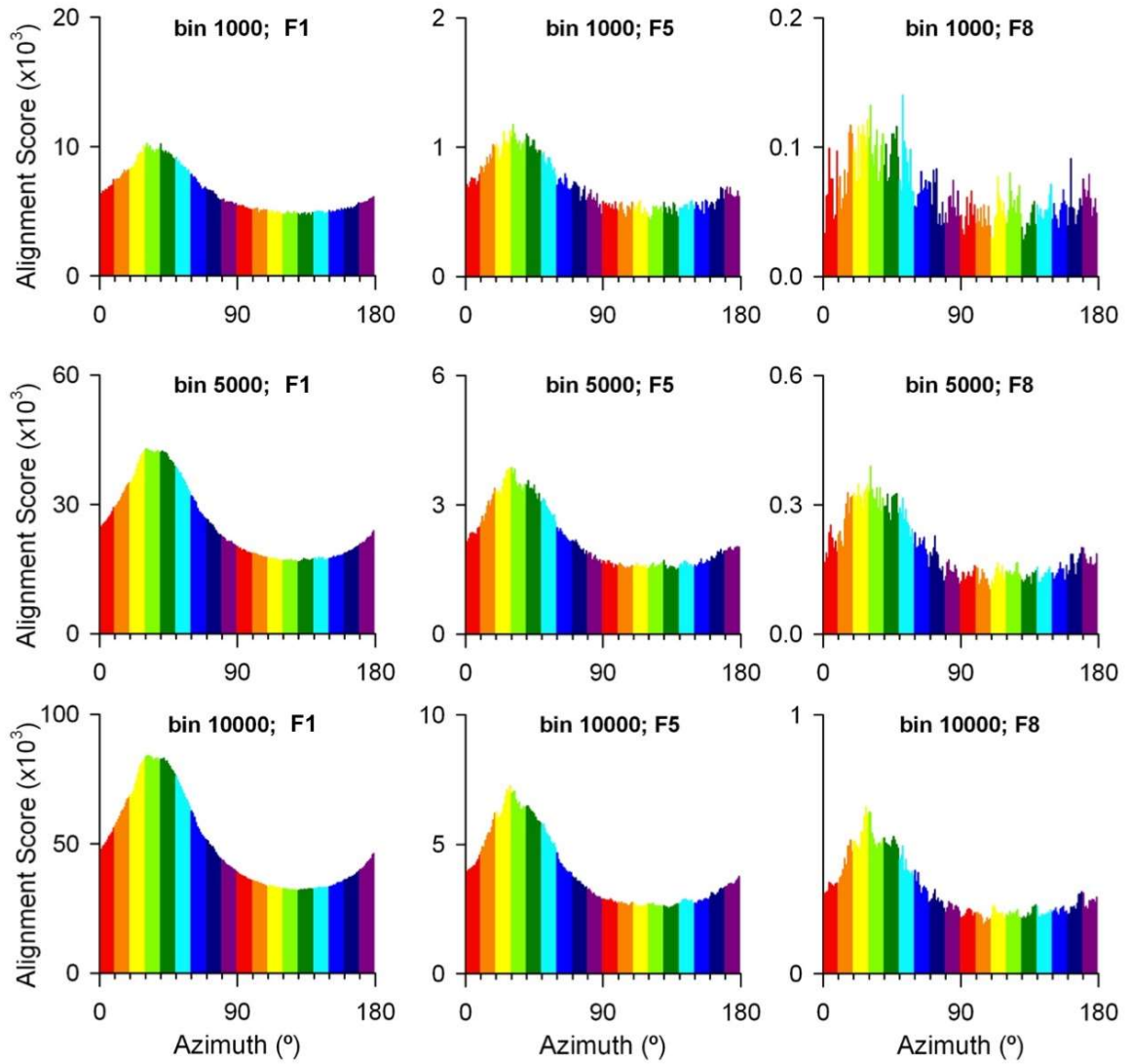


Figure S3. Peak-Alignment Analysis in Area #1 Quito Using Different Bin Width and Peak Filtering Levels. Bin 1000, 5000 and 10000 means bin width of 1, 5 and 10 km.

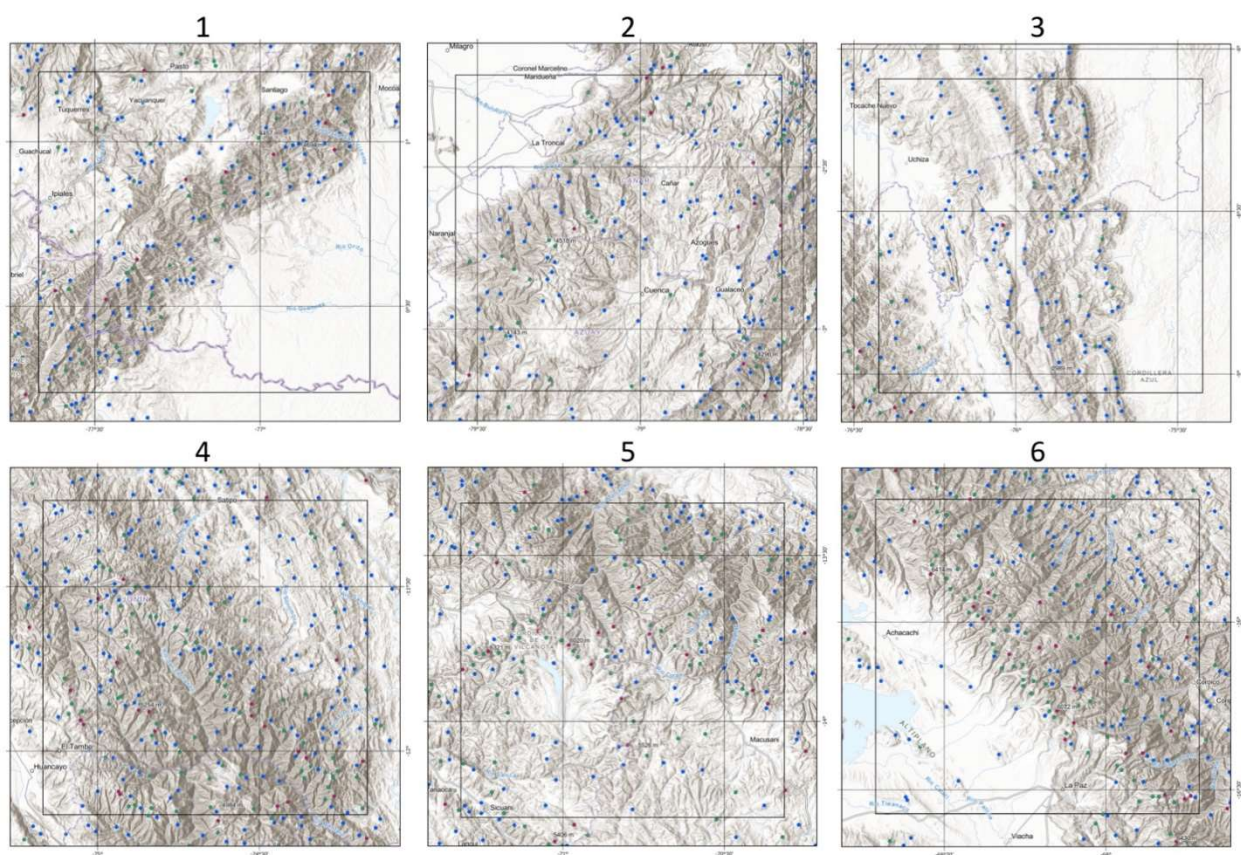


Figure S4. Peak Detection on Sub-areas From #1 to #6. Sub-area is marked on the black square. Peaks are shown with dots of blue (F1), green (F5), and red (F8).

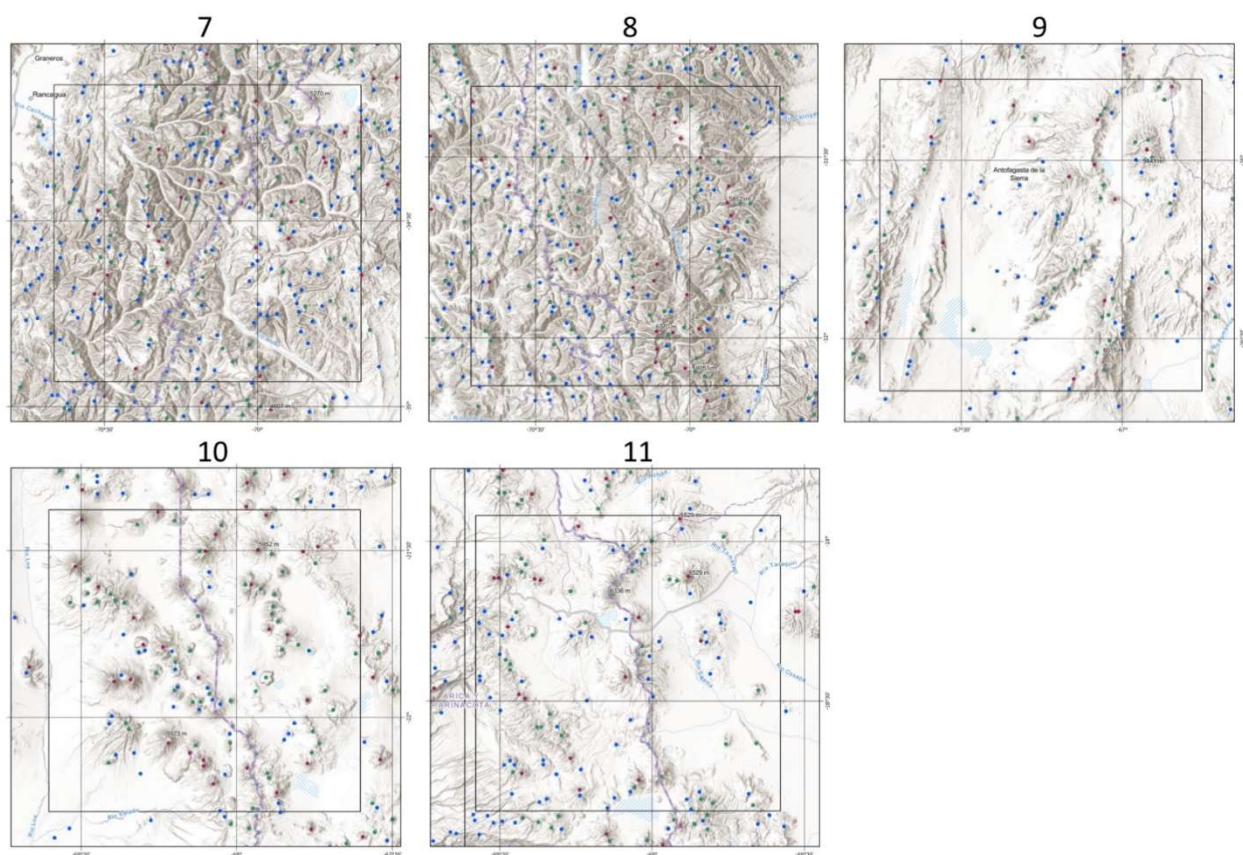


Figure S5. Peak Detection on Sub-areas From #7 to #11. The sub-area is marked on the black square. Peaks are shown with dots of blue (F1), green (F5), and red (F8).

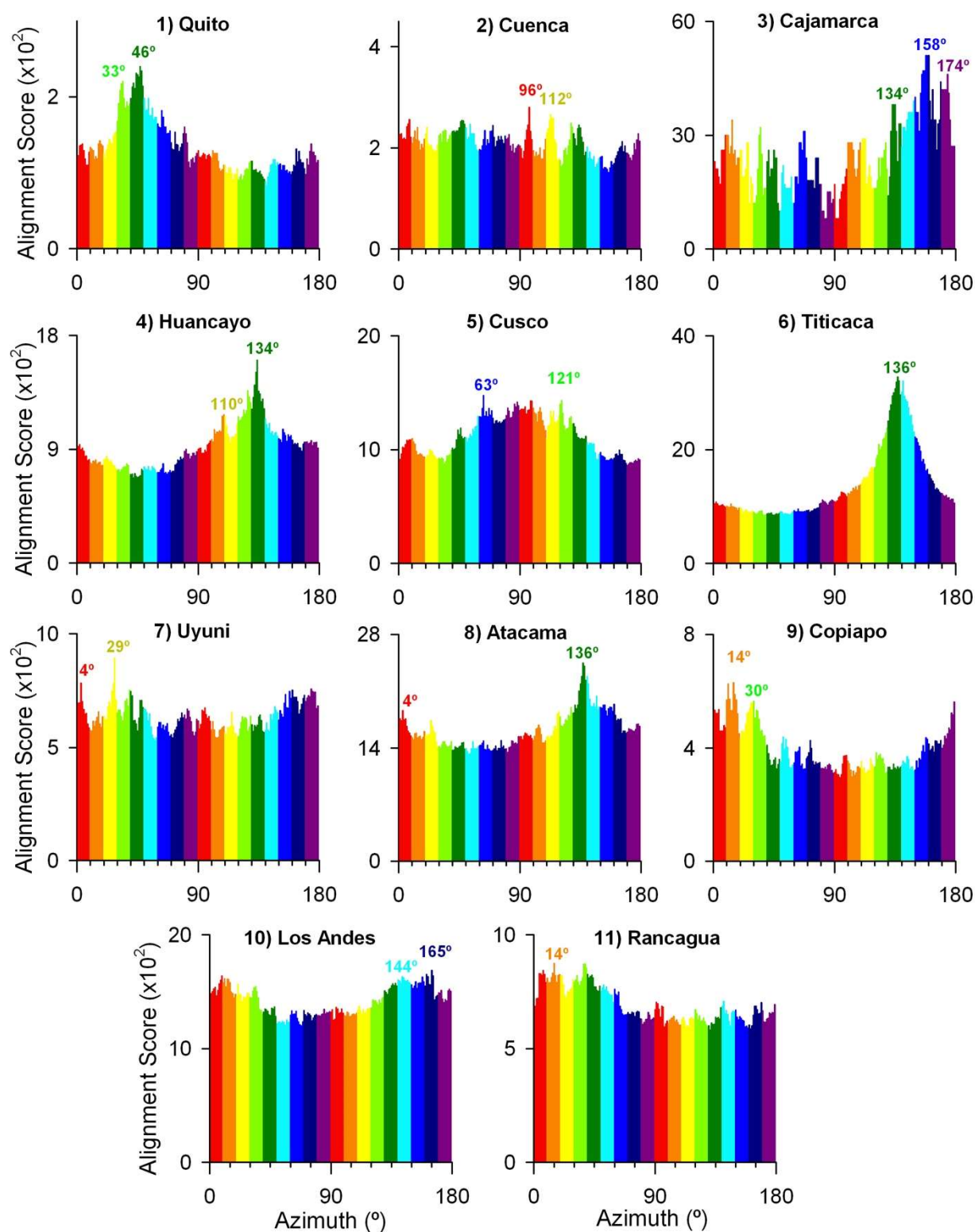


Figure S6. Peak-Alignment Score Analysis in Sub-areas. The azimuth for the first-, second-, and third-highest alignment scores are marked with numbers. All sub-areas were analyzed at a bin width of 5 km and peak level F5.

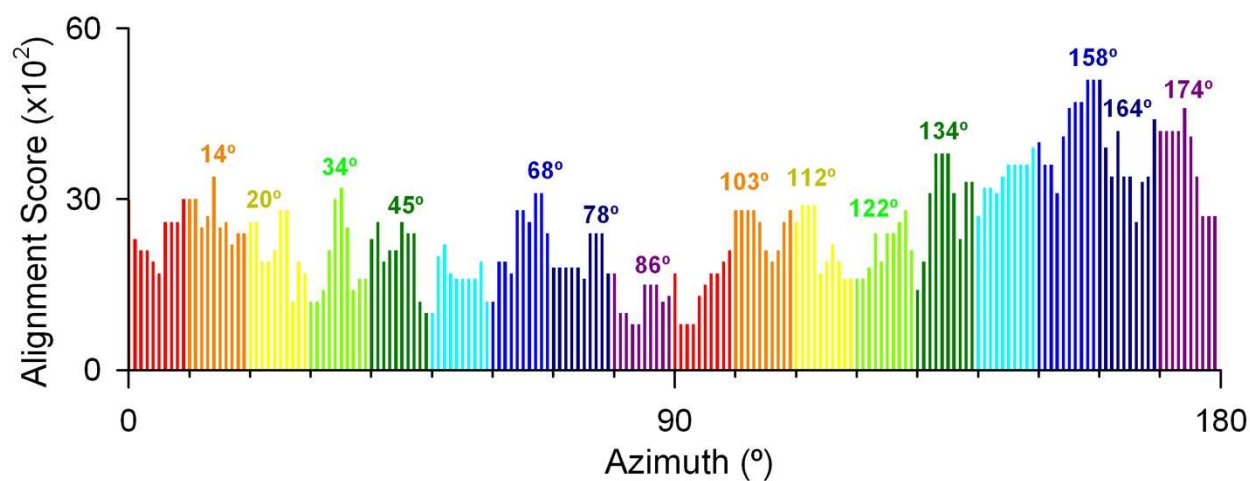


Figure S7. Peak-Alignment Score Analysis in Sub-Areas #3 Cajamarca shown in Fig S6. Clear spikes on alignment scores are marked with numbers corresponding to similar azimuths found on the large area analysis. Analysis was performed with a bin width of 5 km and peak level F5.



Figure S8. Planimetric Survey of Ingapirca.

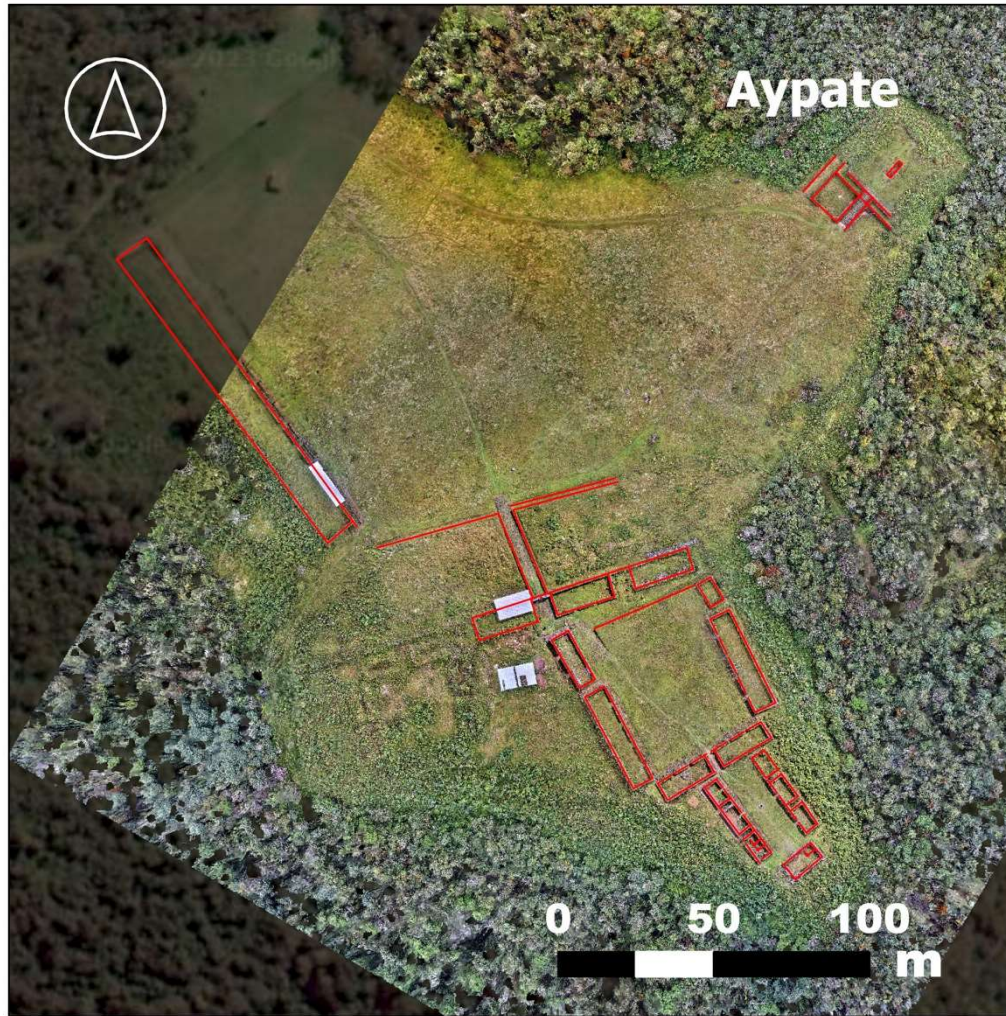


Figure S9. Planimetric Survey of Aypate.

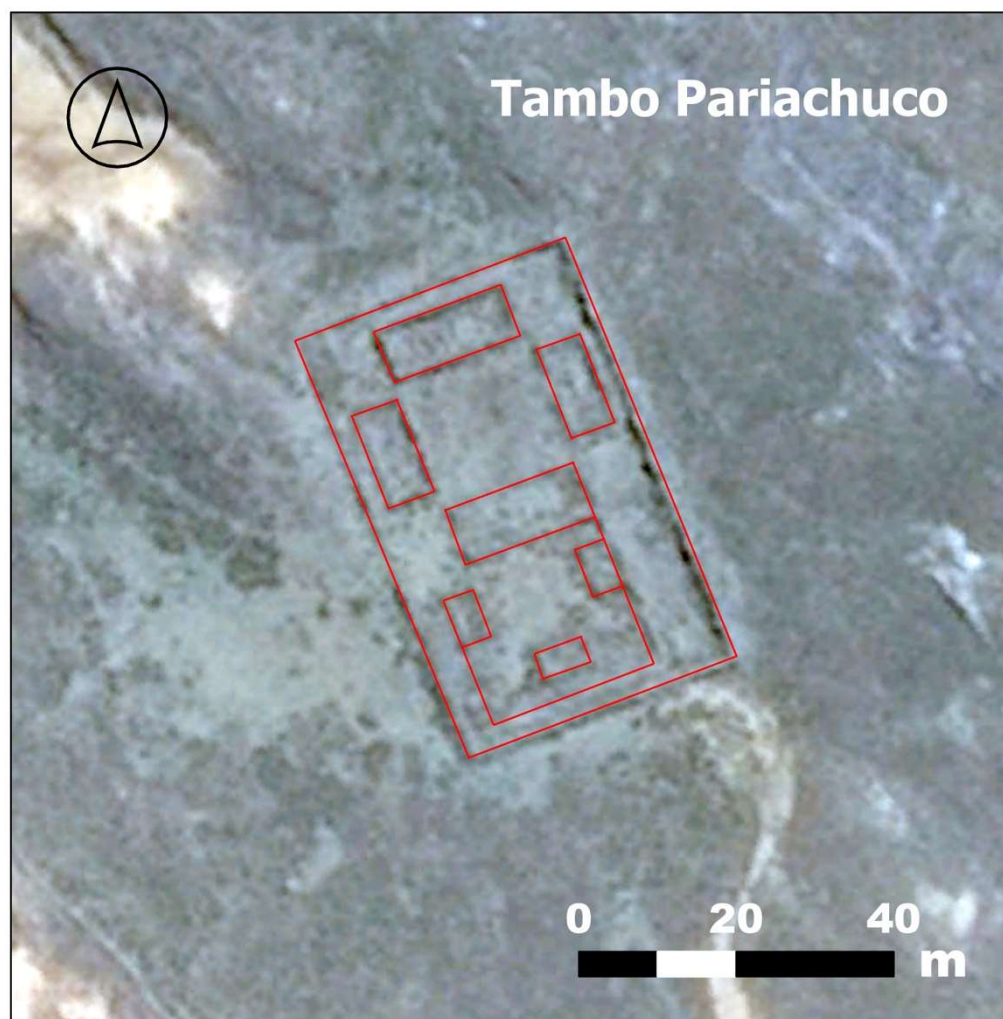


Figure S10. Planimetric Survey of Tambo Pariachuco.

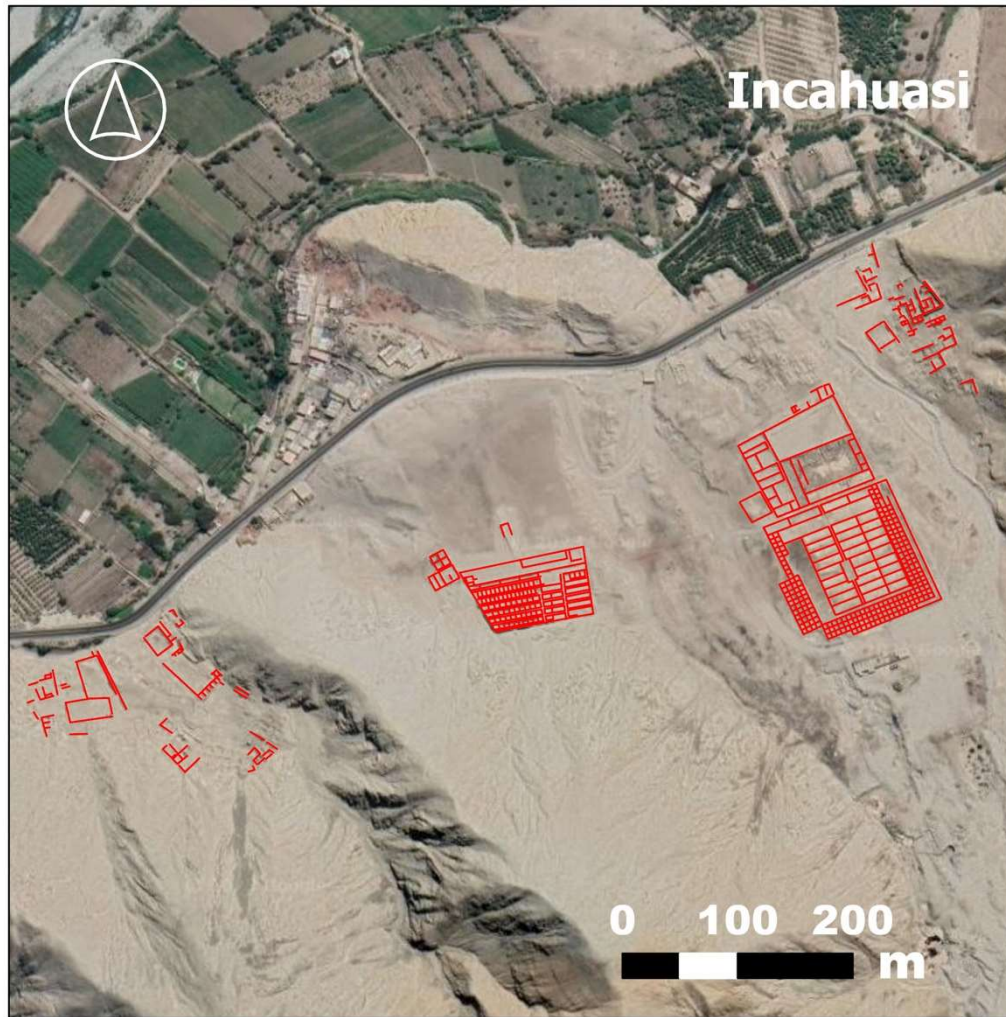


Figure S11. Planimetric Survey of Incahuasi.

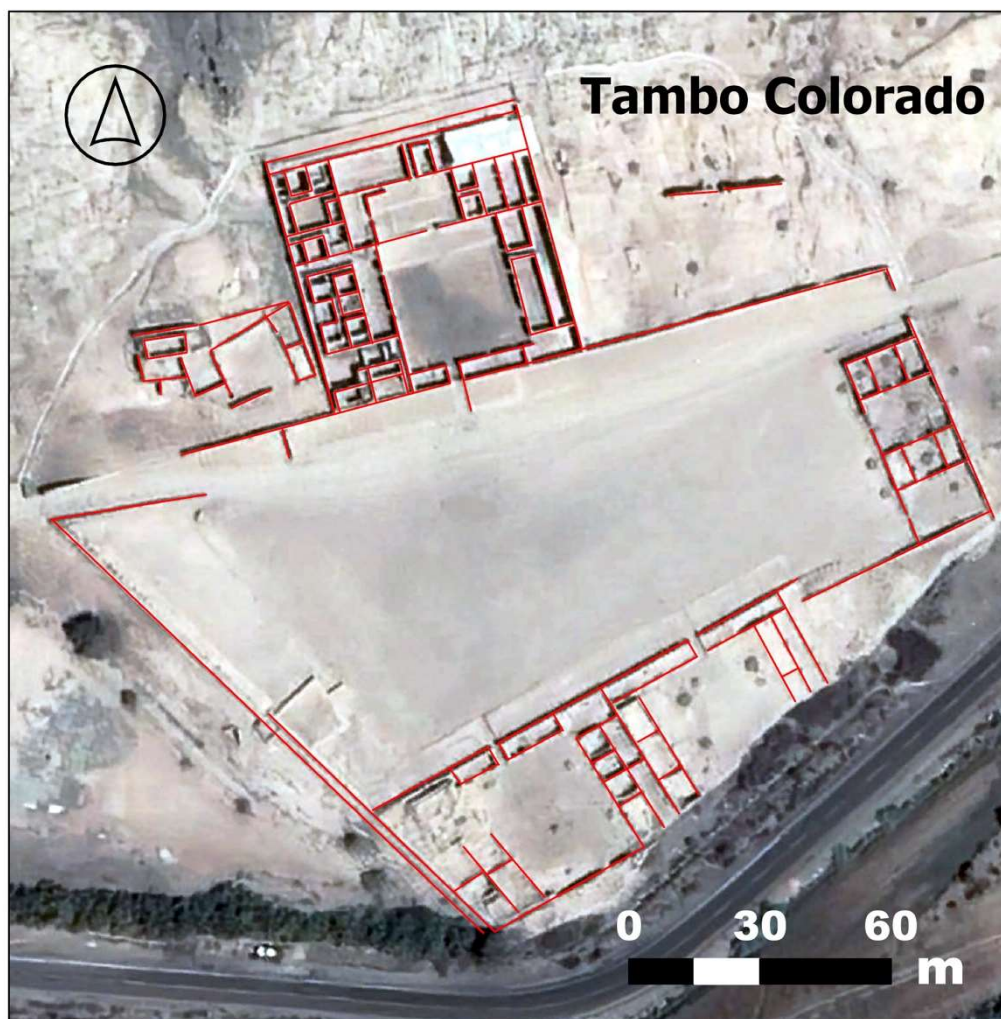


Figure S12. Planimetric Survey of Tambo Colorado.

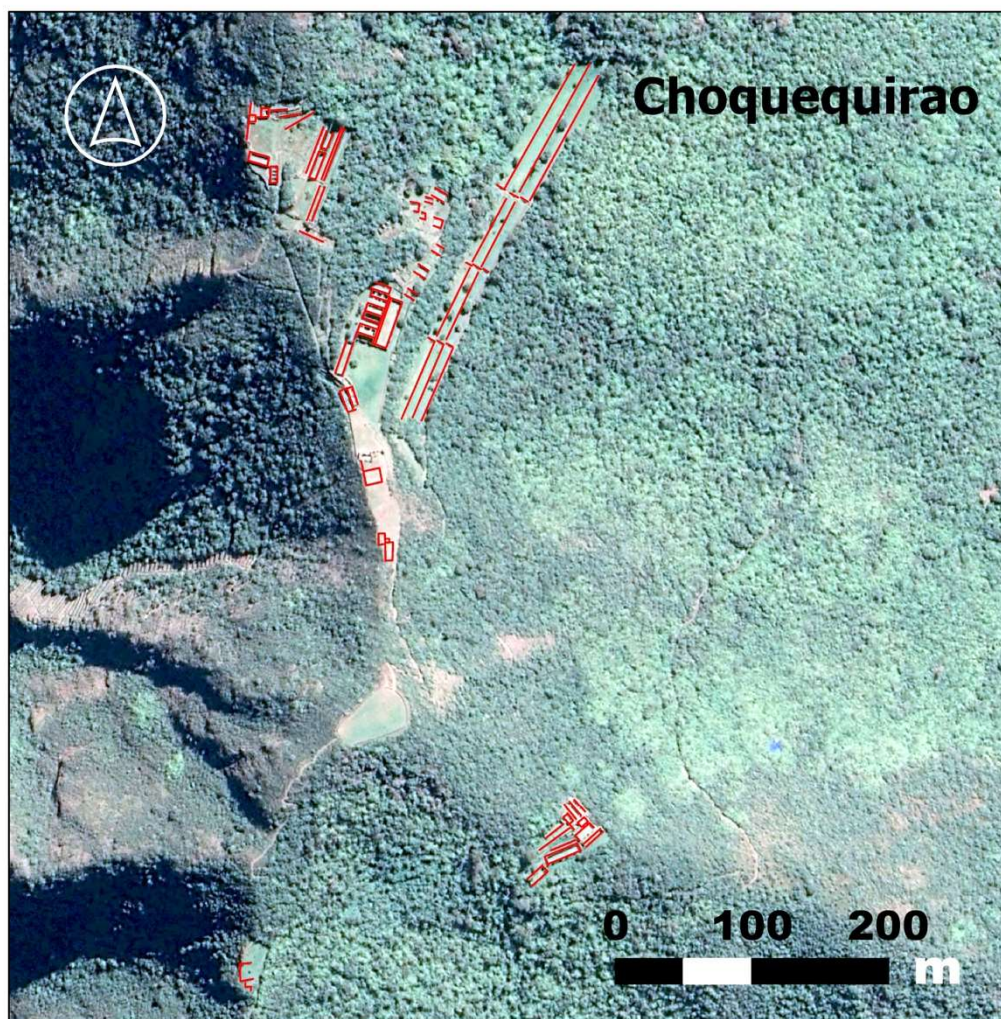


Figure S13. Planimetric Survey of Choquequirao.

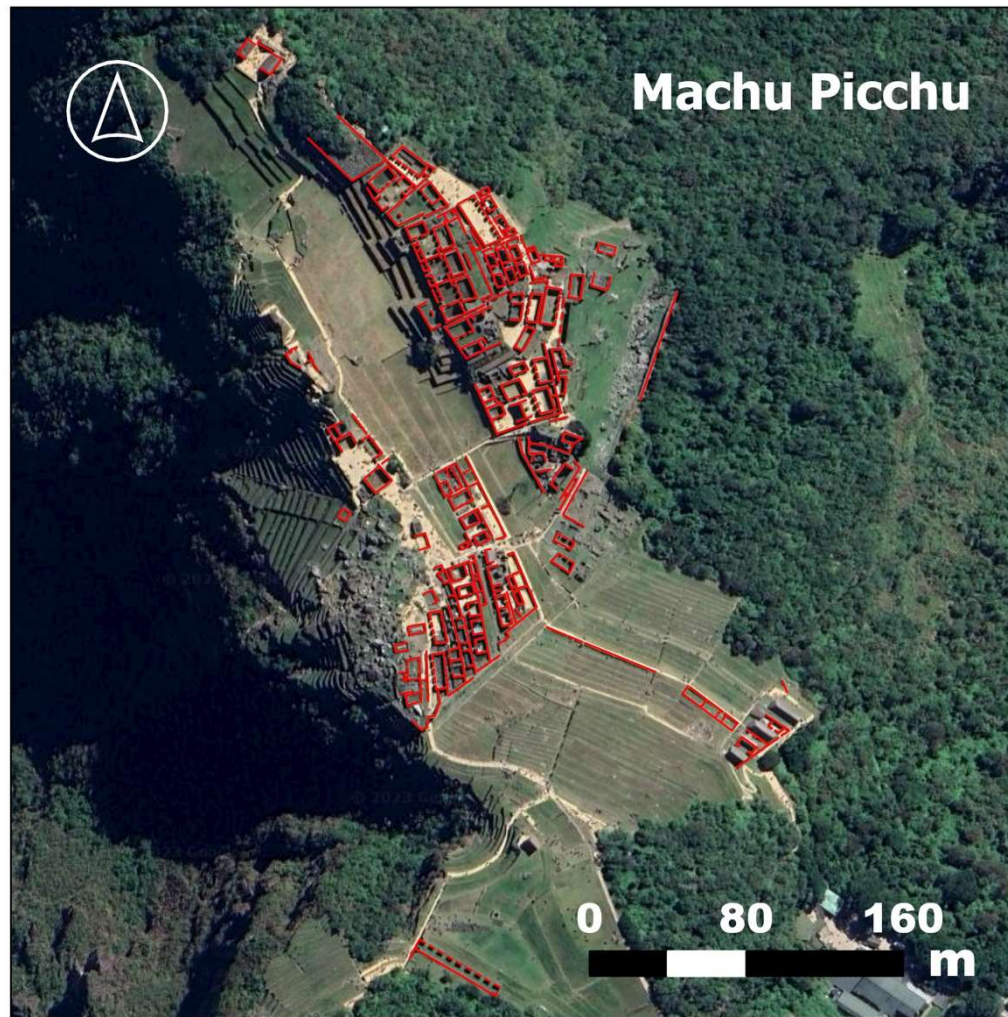


Figure S14. Planimetric Survey of Machu Picchu.

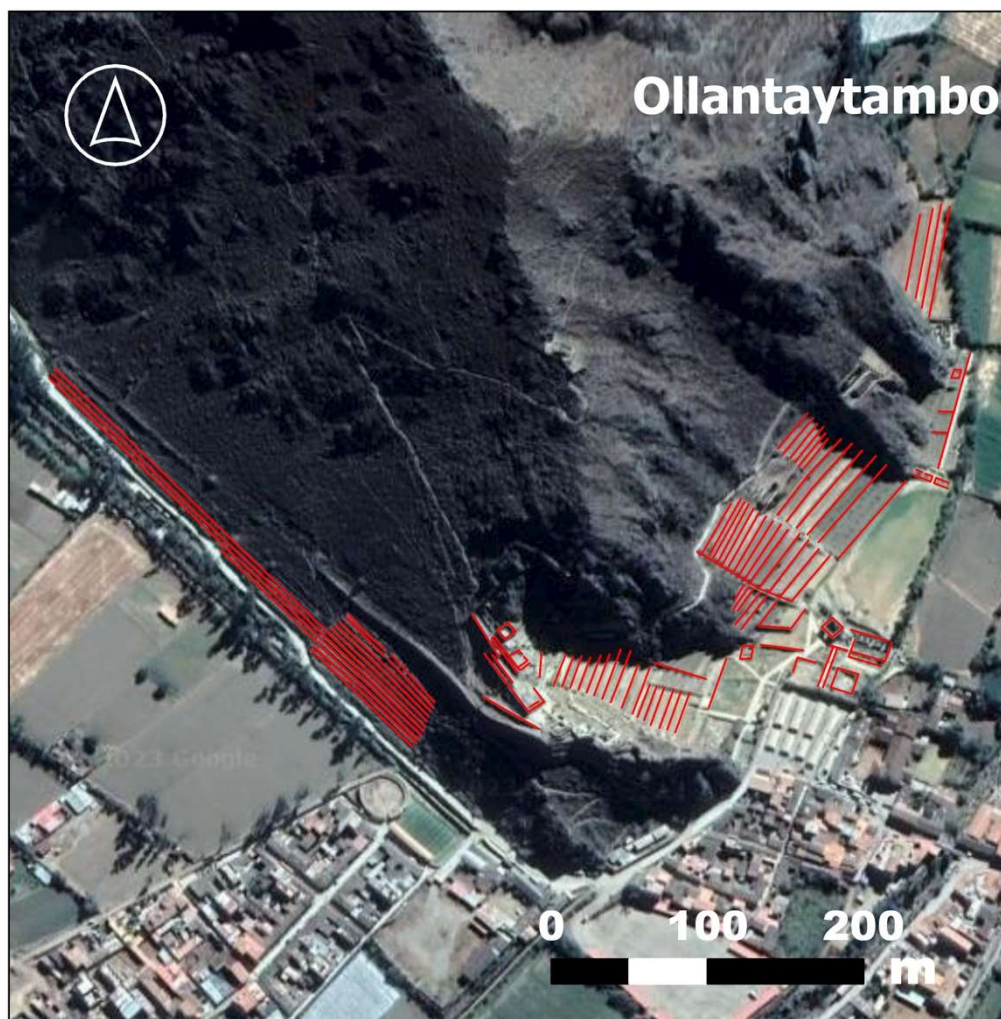


Figure S15. Planimetric Survey of Ollantaytambo.

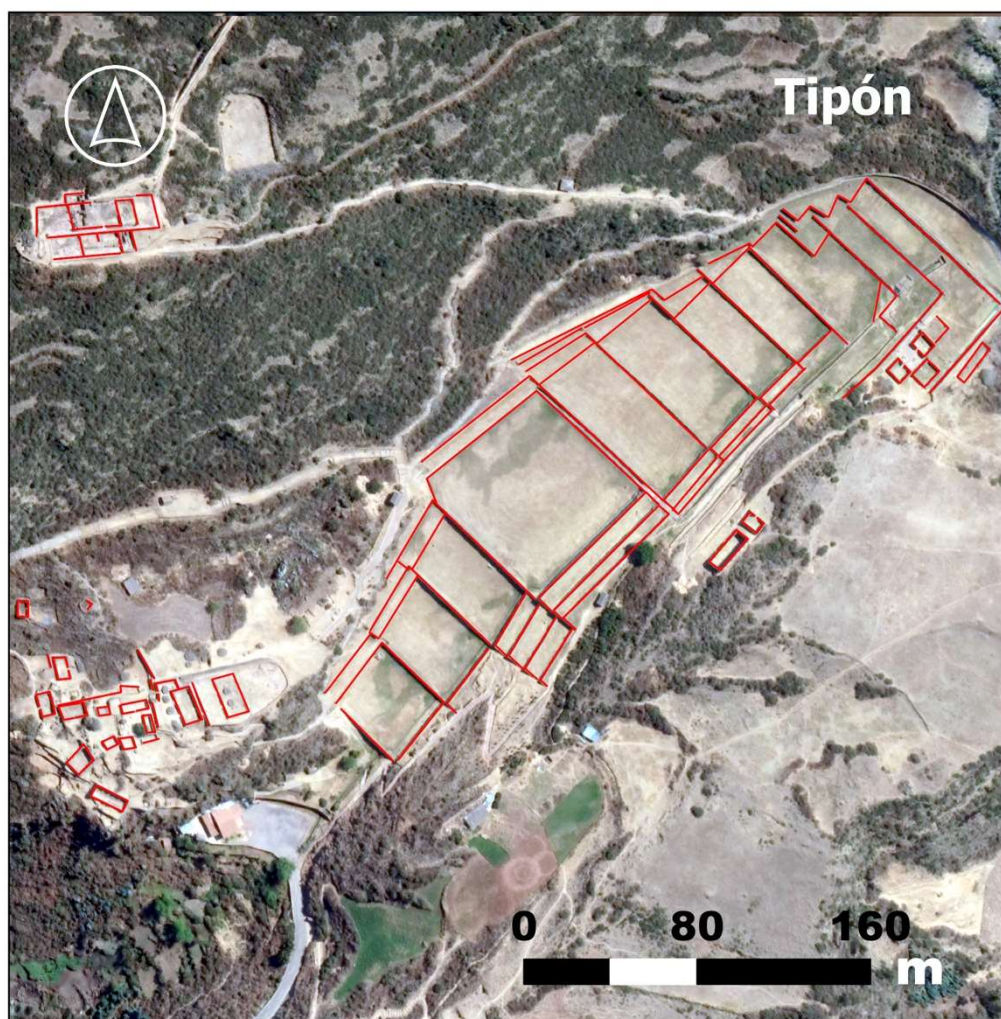


Figure S16. Planimetric Survey of Tipón.

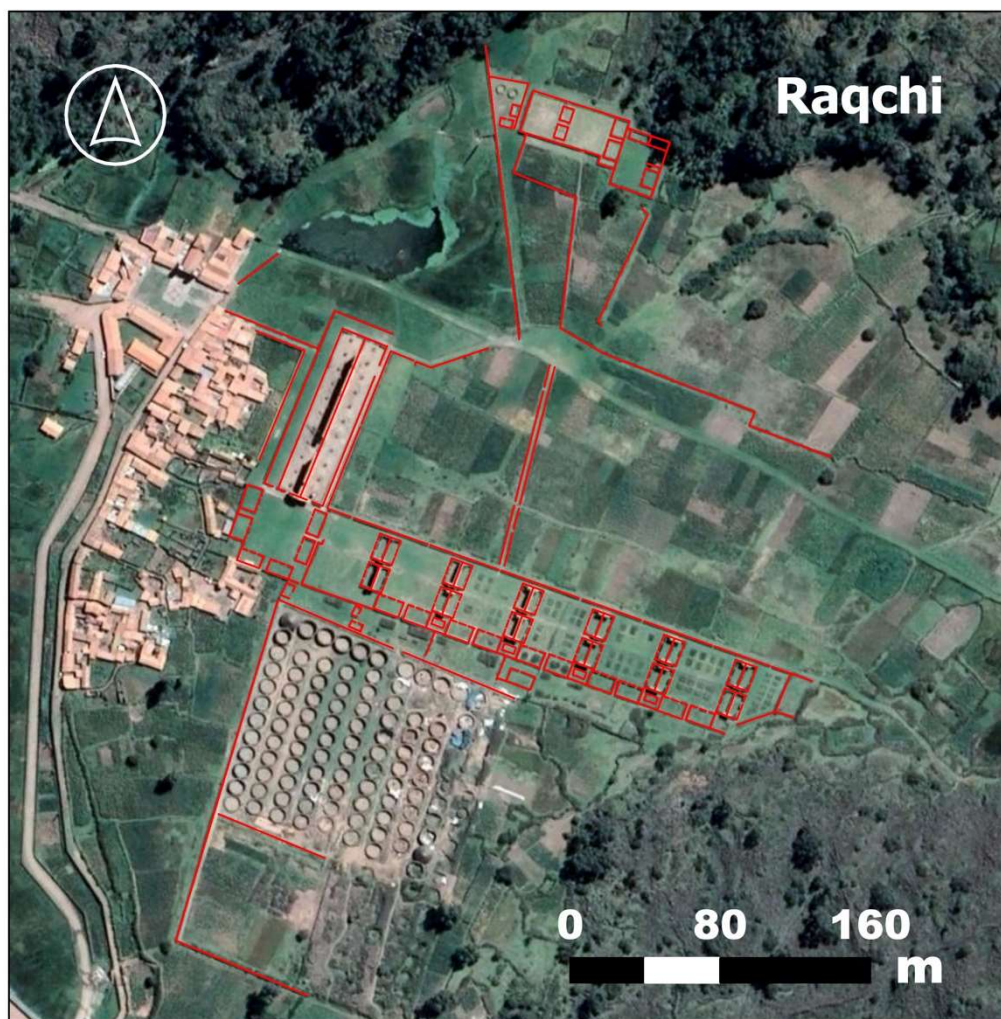


Figure S17. Planimetric Survey of Raqchi.

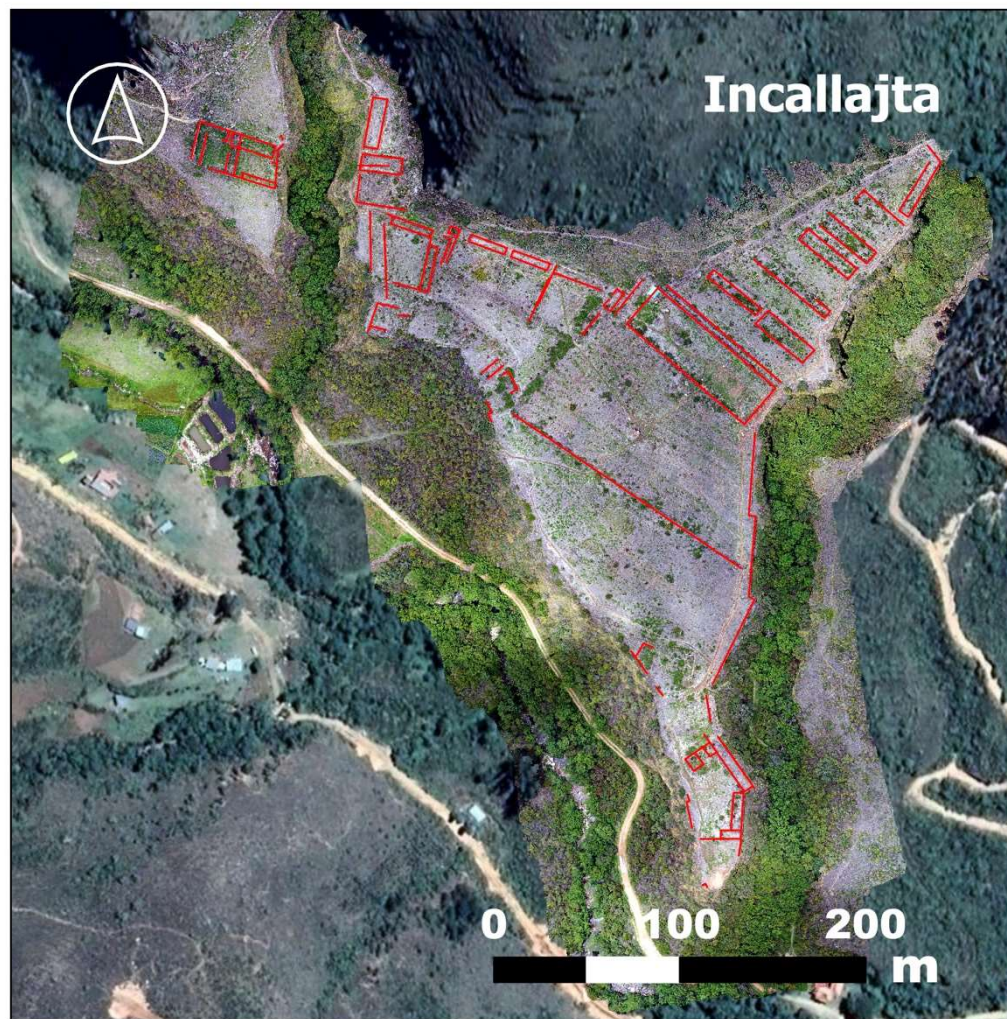


Figure S18. Planimetric Survey of Incallajta.

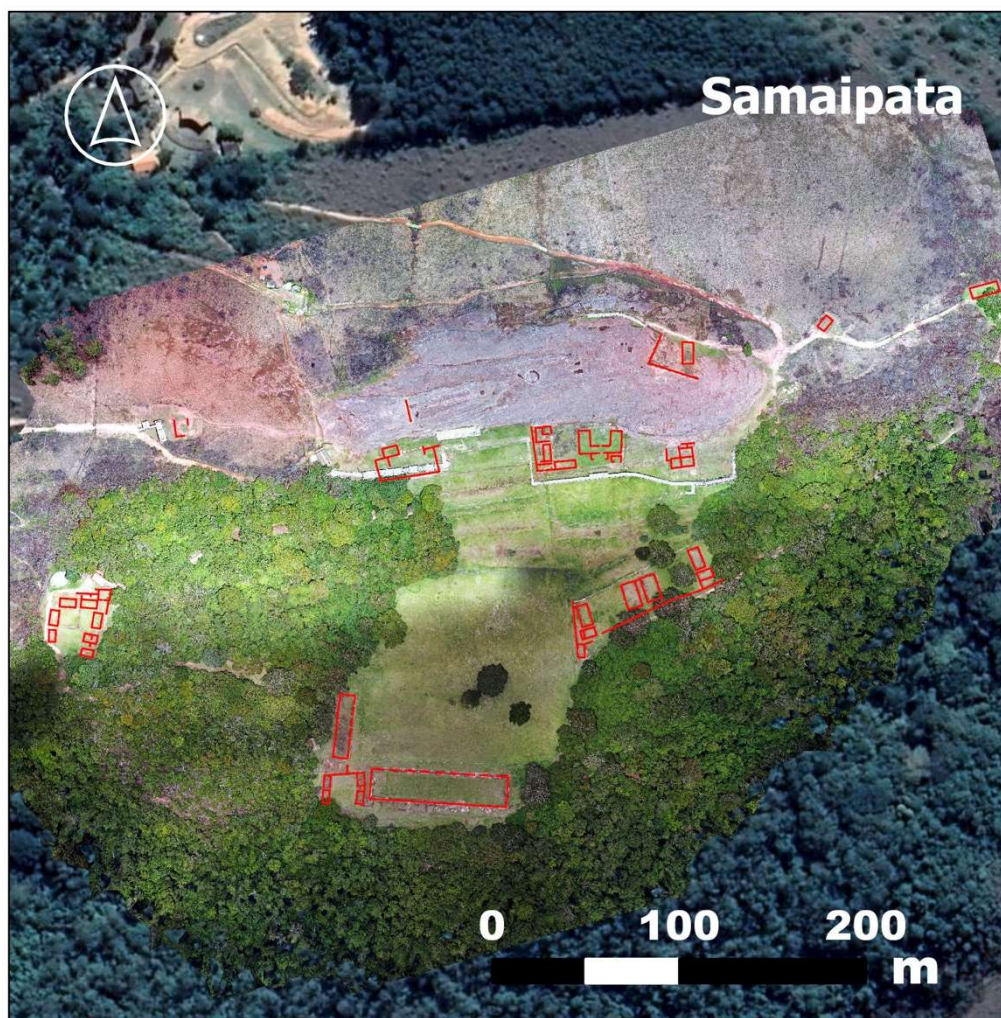


Figure S19. Planimetric Survey of Samaipata.

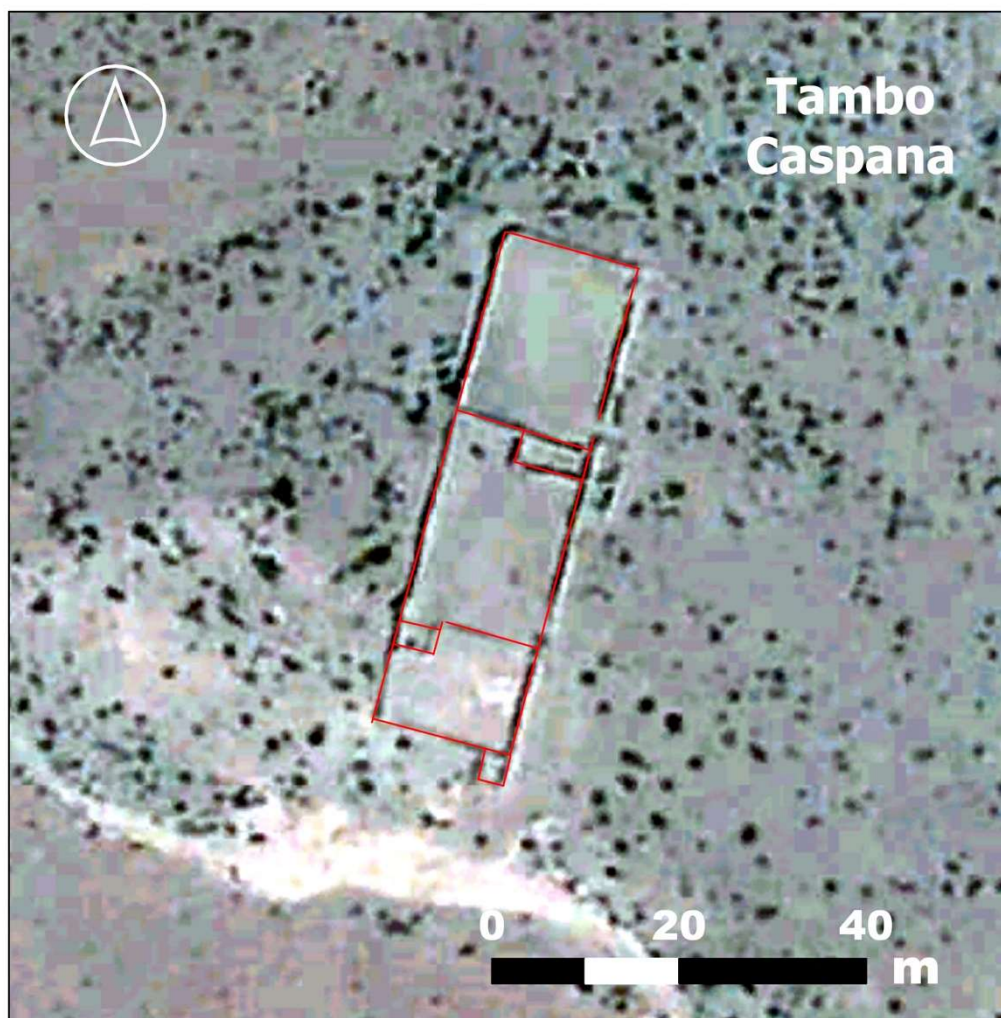


Figure S20. Planimetric Survey of Tambo Caspana.

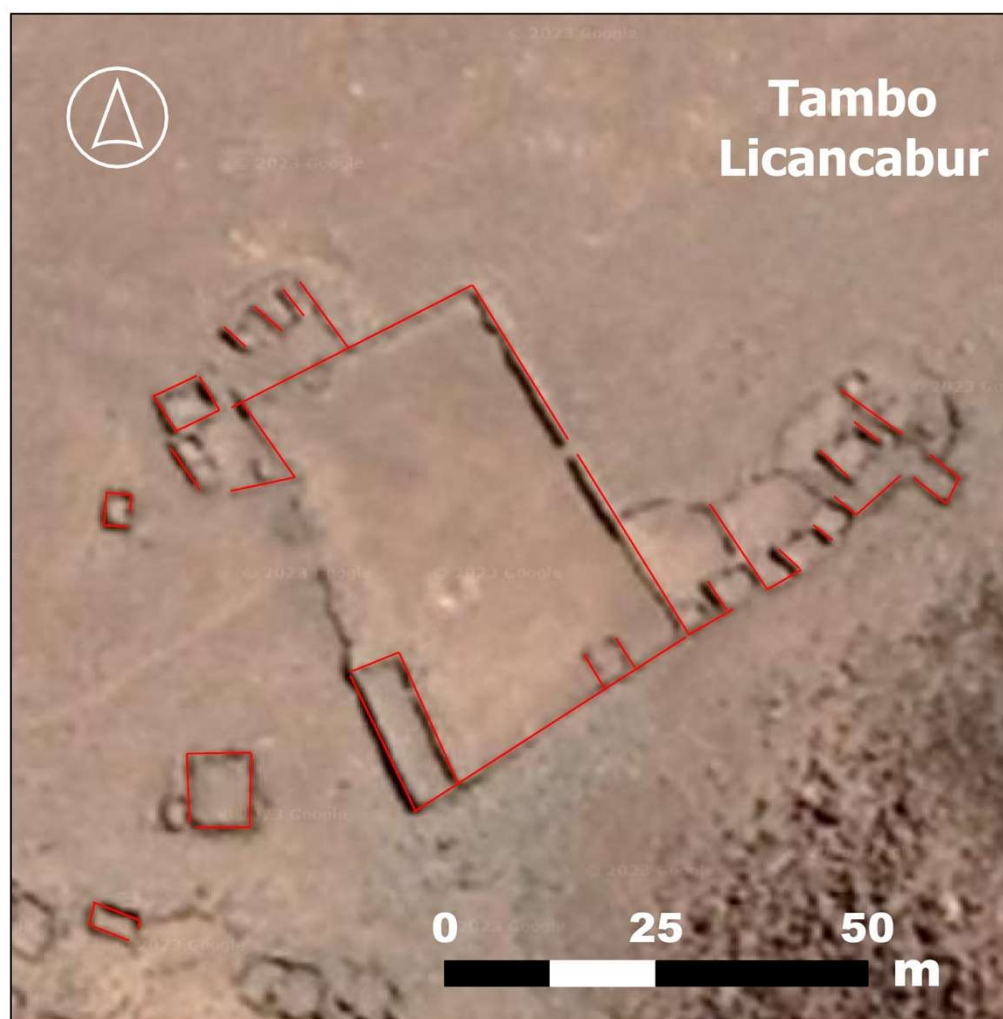


Figure S21. Planimetric Survey of Tambo Licancabur.

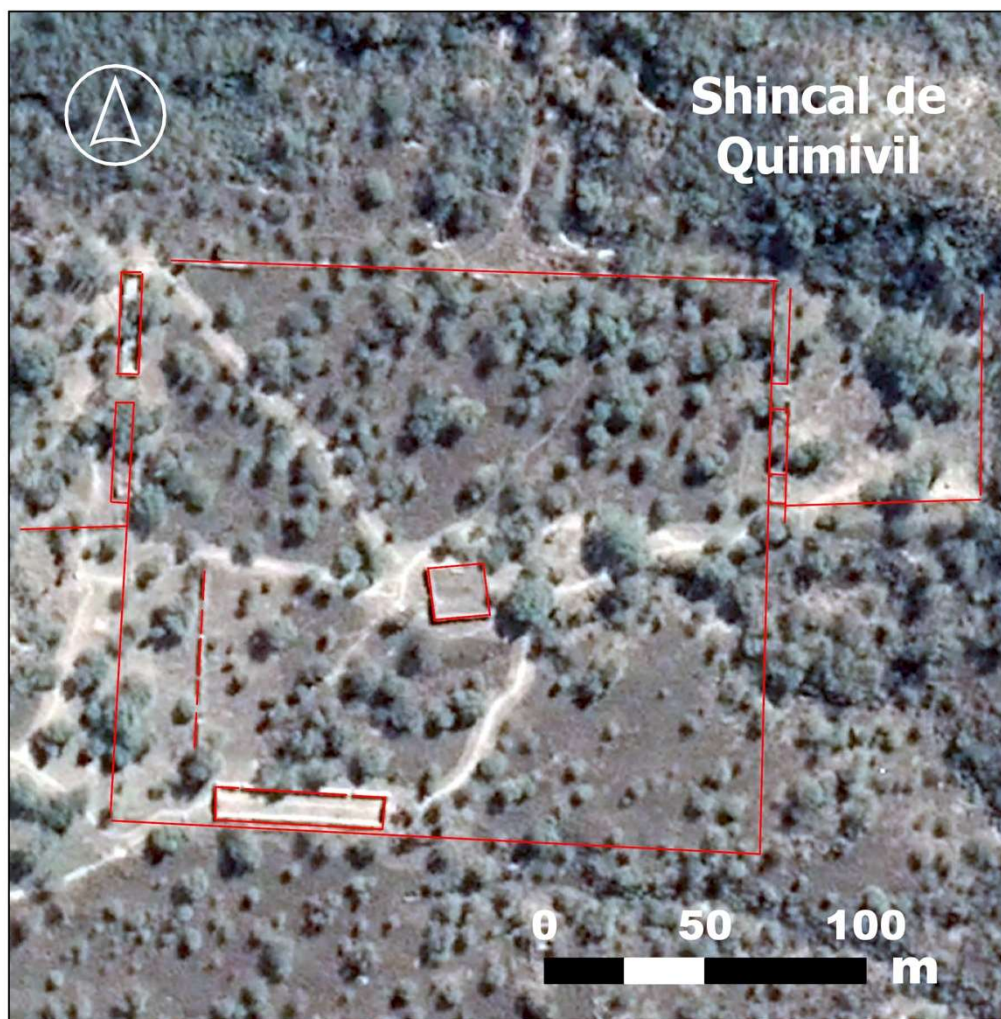


Figure S22. Planimetric Survey of Shincal de Quimivil.

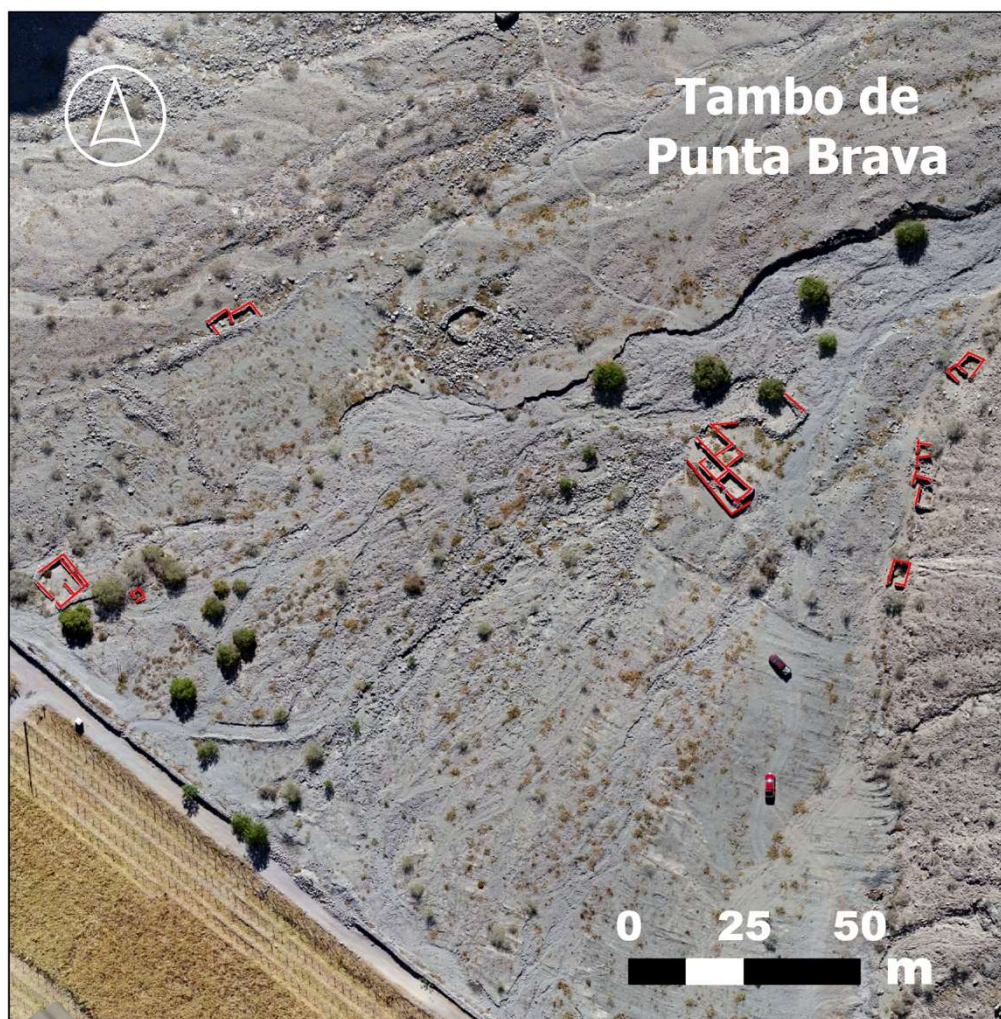


Figure S23. Planimetric Survey of Pucara de Punta de Brava.

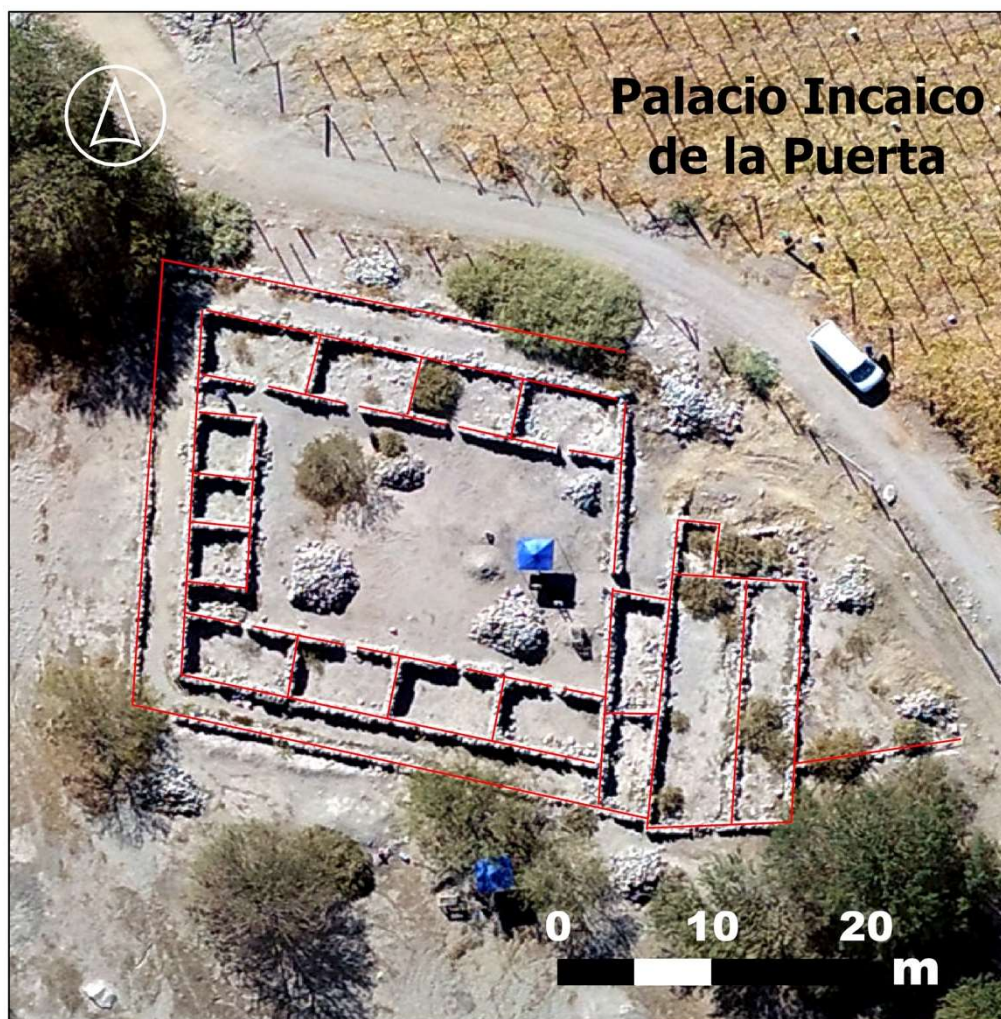


Figure S24. Planimetric Survey of Palacio Incaico de la Puerta.



Figure S25. Planimetric Survey of Viña del Cerro.

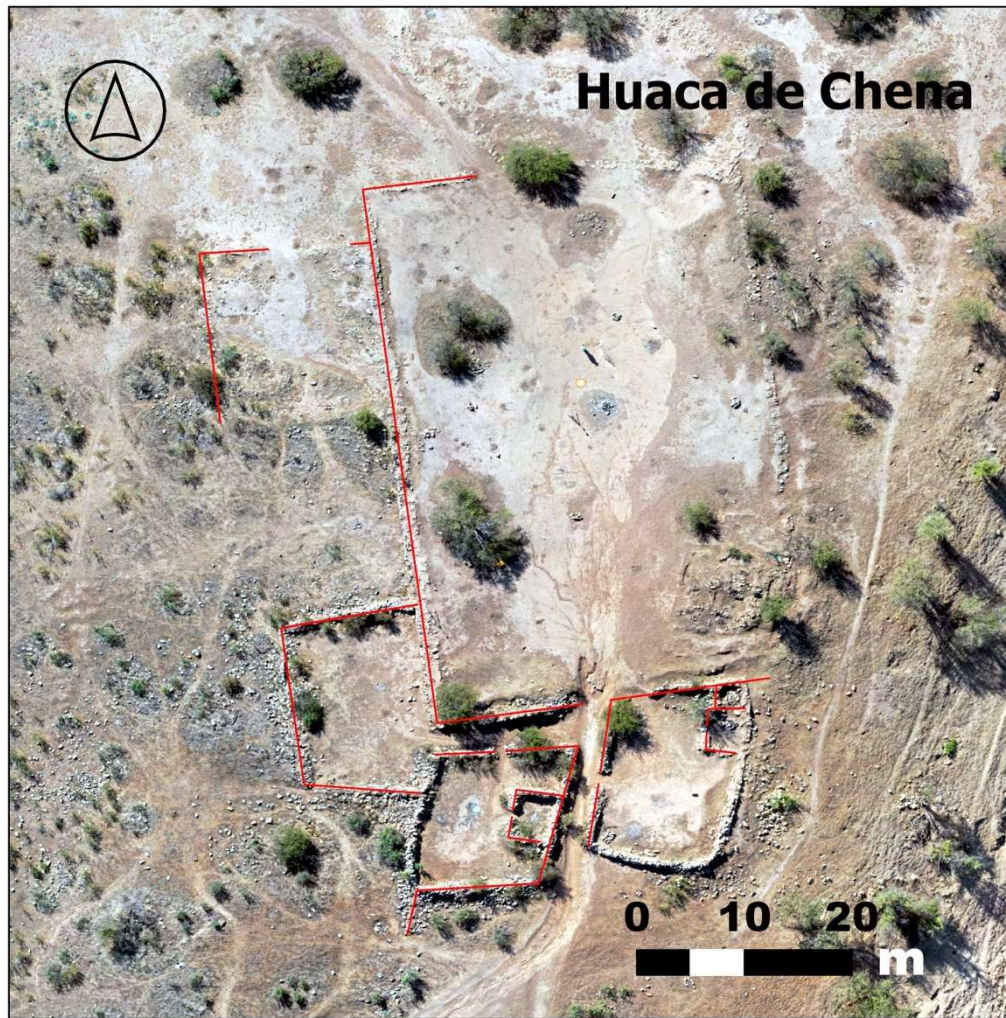


Figure S26. Planimetric Survey of Huaca de Chena.

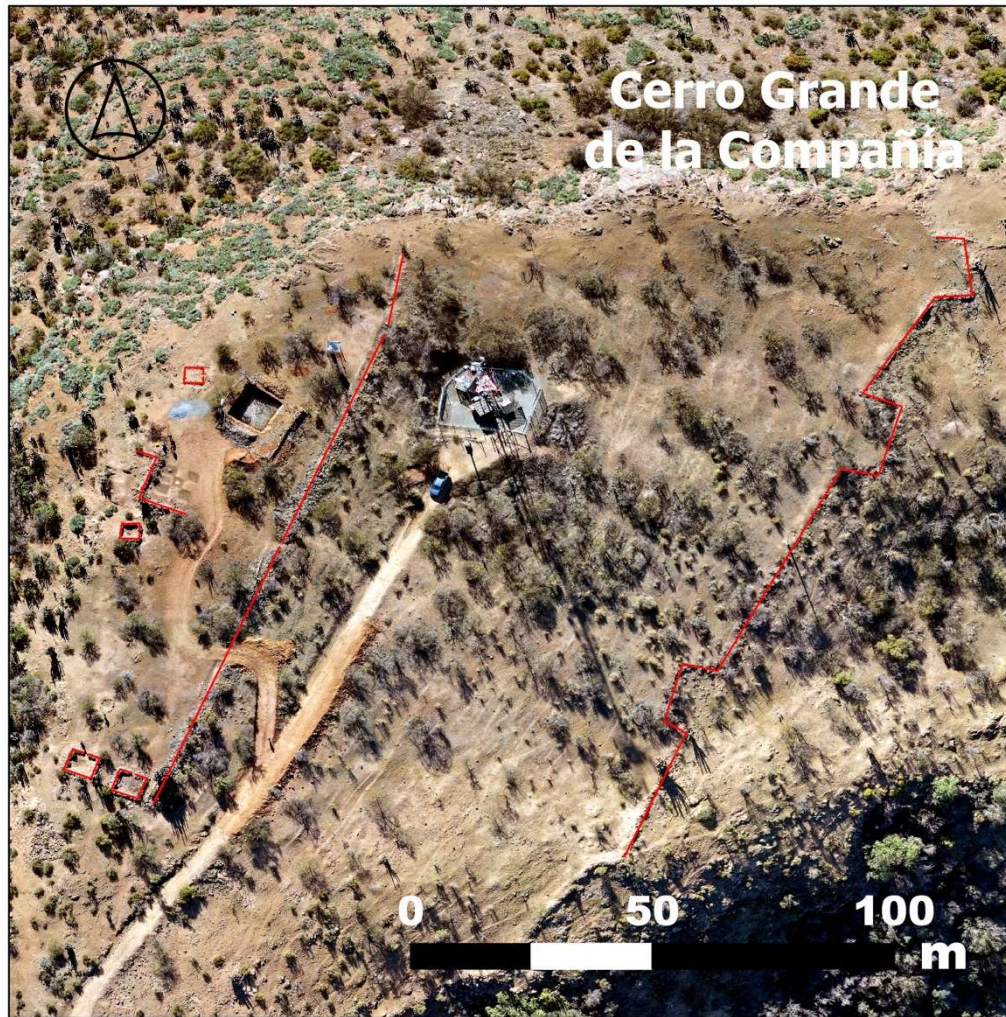


Figure S27. Planimetric Survey of Cerro Grande de la Compañía.

Table S1. Selected Inka Sites for This Study. Site coordinates in decimal degrees (DD) and site image sources are provided. GS (Google Earth Satellite); OH (Open Heritage 3D); MNHN (National Museum of Natural History of Chile); and CA (Código Andino Archive). * Project Aypate 2022 (*Aypate—Photogrammetry—Aerial, Collected by Ministry of Culture. Distributed by Open Heritage 3D., 2022*).

Site #	Name	Country	Lat. (DD)	Long. (DD)	Elevation (masl)	Category	Image Source
1	Ingapirca	Ecuador	-2,5402	-78,8740	3,144	Royal Residence/Temple	GS (1/2021)
2	Aypate	Perú	-4,7093	-79,5746	2,915	Administrative/Ceremonial/Agricultural	OH* (6/2022)
3	Pariachuco	Perú	-8,3775	-77,7869	4,468	Ceremonial/Tambo	GS (7/2017)
4	Incahuasi (Lunahuaná)	Perú	-13,0231	-76,1759	380	Royal Residence/Ceremonial Complex	GS (7/2019)
5	Tambo Colorado	Perú	-13,7052	-75,8293	484	Administrative/Tambo	GS (12/2021)
6	Choquequirao	Perú	-13,3925	-72,8737	3,050	Urban/Ceremonial Complex	GS (5/2020)
7	Machu Pichu	Perú	-13,1628	-72,5449	2,430	Royal Residence/Temple	GS (5/2023)
8	Ollantaytambo	Perú	-13,2569	-72,2655	2,792	Llaqta/Ceremonial/agricultural Complex	GS (7/2021)
9	Tipón	Perú	-13,5704	-71,7833	3,560	Royal Residence/Water Sanctuary	GS (9/2020)
10	Raqchi	Perú	-14,1743	-71,3702	3,335	Ceremonial/Agricultural Center	GS (4/2021)
11	Incallajta	Bolivia	-17,6050	-65,4156	2,961	Urban/Ceremonial Complex	CA (2022)
12	Samaipata	Bolivia	-18,1798	-63,8199	1,900	Residential/Ceremonial Complex	CA (2023)
13	Caspana	Chile	-22,3761	-68,1914	3,540	Tambo	GS (12/2019)
14	Licancabur	Argentina	-22,8321	-67,8566	4,703	Sanctuary/Tambo	GS (3/2019)
15	Shinkal	Argentina	-27,6865	-67,1785	1,350	Ceremonial Center	GS (12/2021)
16	Punta Brava	Chile	-27,7843	-70,1508	875	Tambo	MNHN (2018)
17	P. Incaico de la P.	Chile	-27,8236	-70,1293	930	Residential/Administrative Center	MNHN (2018)
18	Viña del Cerro	Chile	-27,9024	-70,0310	1,090	Metallurgical/Ceremonial Complex	MNHN (2018)
19	Huaca de Chena	Chile	-33,6151	-70,7469	640	Pucará-Shrine	CA (2020)
20	La Compañía	Chile	-34,0682	-70,6836	670	Pucará-Shrine	CA (2021)
V1	Volcán Maipo	Chile	-34,2067	-69,7766	3,480	Uncategorized	CA (2021)