

# ARCHAEOLOGY OF A SACRED MOUNTAIN

## Mounds, water, mobility, and cosmologies of Ikh Bogd Uul, Eastern Altai Mountains, Mongolia

Tesis doctoral presentada por:  
**CECILIA DAL ZOVO**



Bajo la dirección de:  
Dr. FELIPE CRIADO BOADO  
Dr. MARCO V. GARCÍA QUINTELA  
Dr. A. CÉSAR GONZÁLEZ GARCÍA

**PUBLIC DEFENSE:**  
**Friday 5<sup>th</sup> of February 2016, 10 am**  
**Paraninfo de la Universidad,**  
**Santiago de Compostela**



Examination Committee:  
Dr. BRUNO MARCOLONGO (Irpi- CNR, Padova)  
Dr. M. PILAR PRIETO (Universidade de Santiago de Compostela)  
Dr. M. LUISA RUIZ-GÁLVEZ (Universidad Complutense de Madrid)  
Dr. KRISTIAN KRISTIANSEN (University of Gothenburg)  
Dr. CHRIS GOSDEN (University of Oxford)



FERW officers, the local officers of Bogd Council and members of the archaeological expedition on the terraces of Tuyin Gol River, flowing into Orog Nuur Lake, in occasion of a celebratory trip on the Ikh Bogd Uul Mountain, Late August 2011





D. Battogoo inside his valuable Russian car, at the rock art site of Khon-Tsogoni Artalt/Ovoon Shatni Ikh, near Puntsag Ovoo Hill, in the high pastures of Ikh Bogd Uul Mountain, late October 2010.





Carega Mountain, from the hills of Bolca, Lessinia, north-eastern Italy

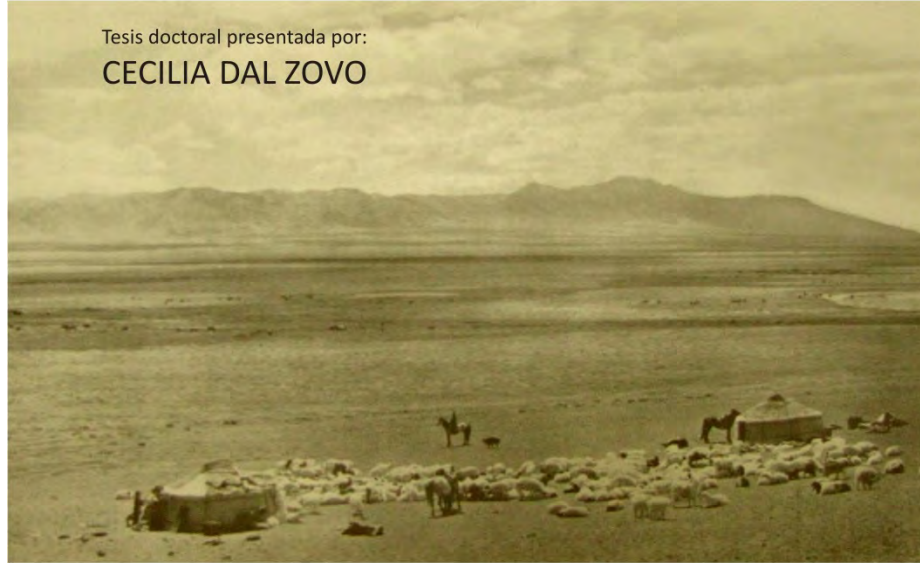




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**CSIC**



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Instituto de  
Ciencias del  
Patrimonio

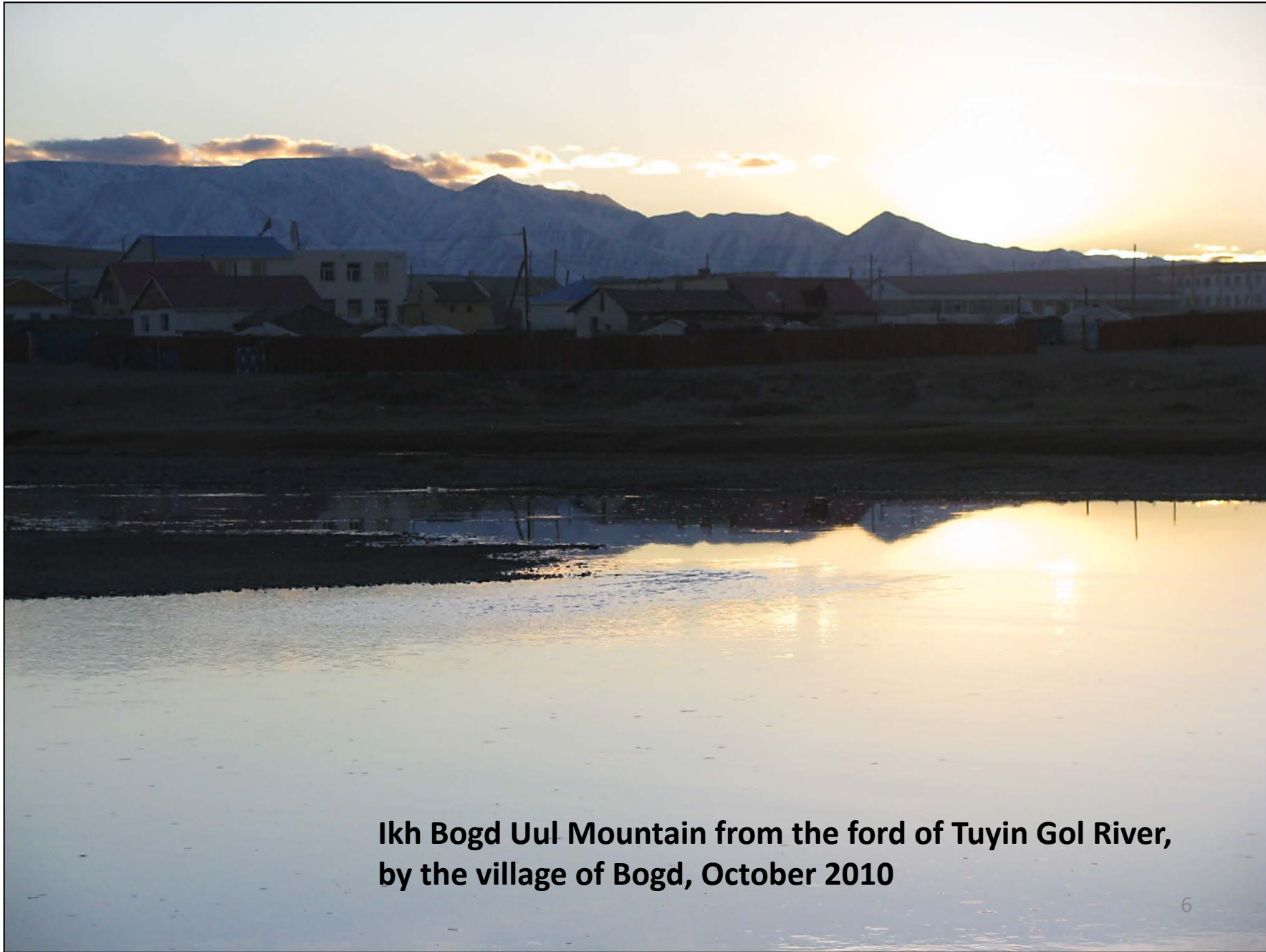


FACULTADE DE XEOGRAFÍA  
E HISTORIA

*Departamento de Historia I*



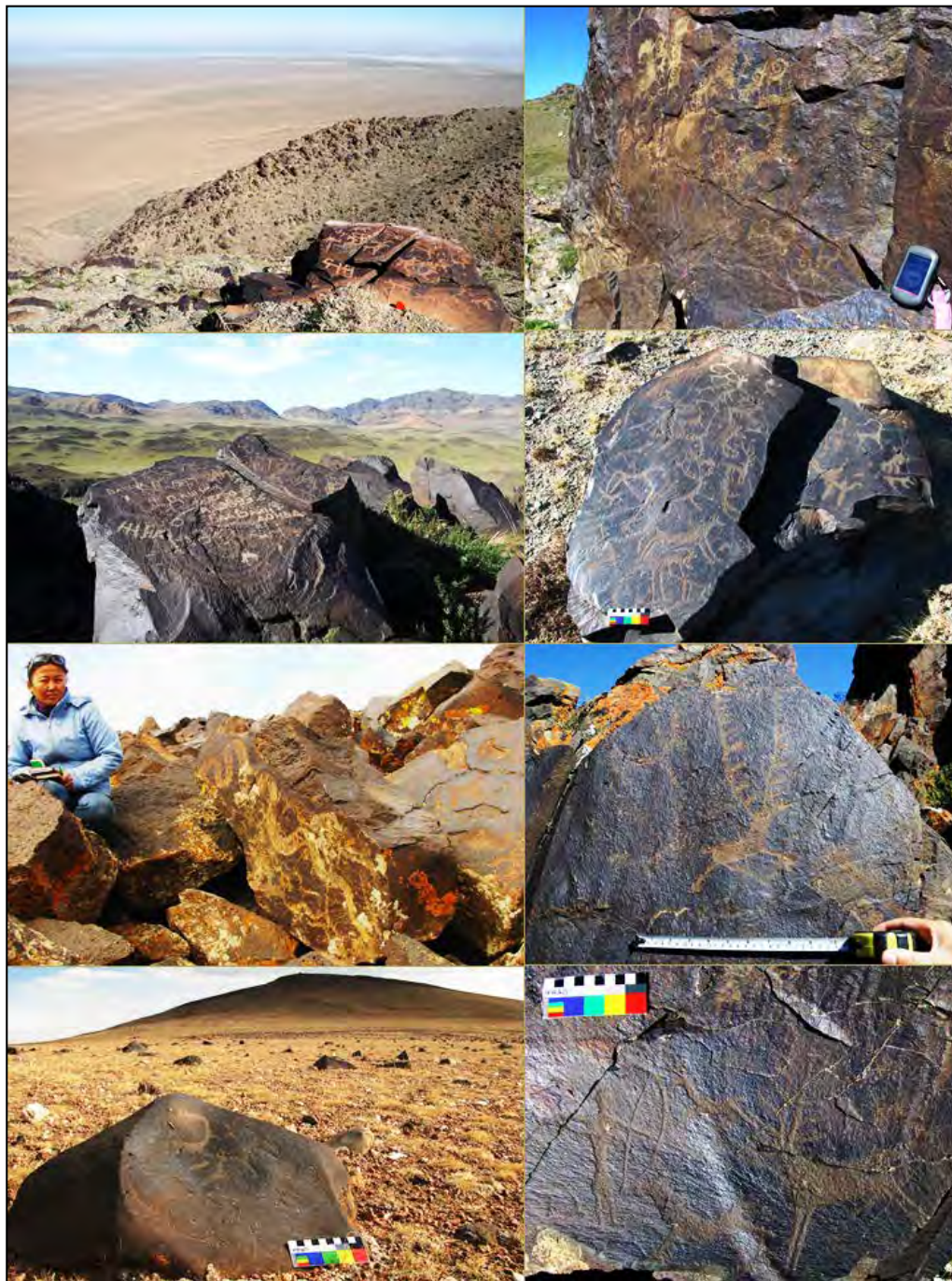
# 1. Origins of this investigation



**Ikh Bogd Uul Mountain from the ford of Tuyin Gol River,  
by the village of Bogd, October 2010**

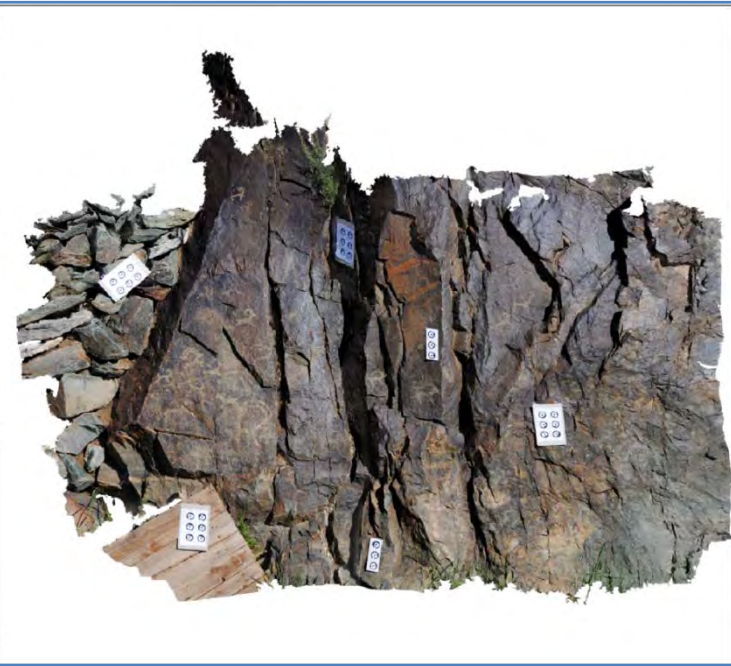
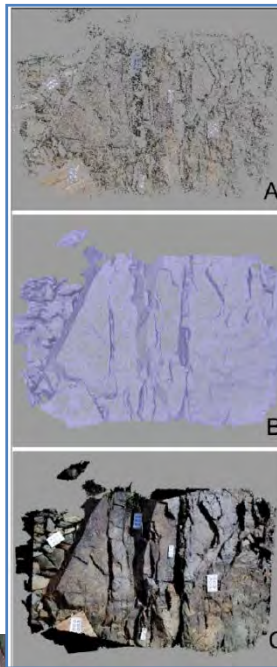
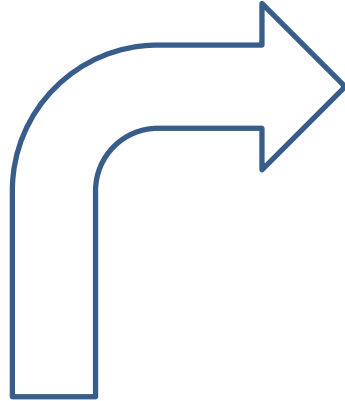


Examples of  
**Rock art sites**  
documented on  
Ikh Bogd Uul  
Mountain  
in four fieldworks:  
2006, 2009, 2010,  
2011.





Rock art panels of Altan Shiree .  
Photo and 3D reconstruction by Yolanda  
Seaone, August 2011



Altan Shiree, Battogoo's wintercamp,  
Late October 2010





Tuul, biologist and translator (left) and Batsuur's brother (right).

Autumn campsite between Orog Nuur and Ikh Bogd Uul, Late August 2011.



## 2. The research area and research framework



Mongolia, Ulaanbaatar and the research area





The Ikh Bogd Uul Mountain and the sandy barcanes SE of Orog Nuur Lake, October 2009





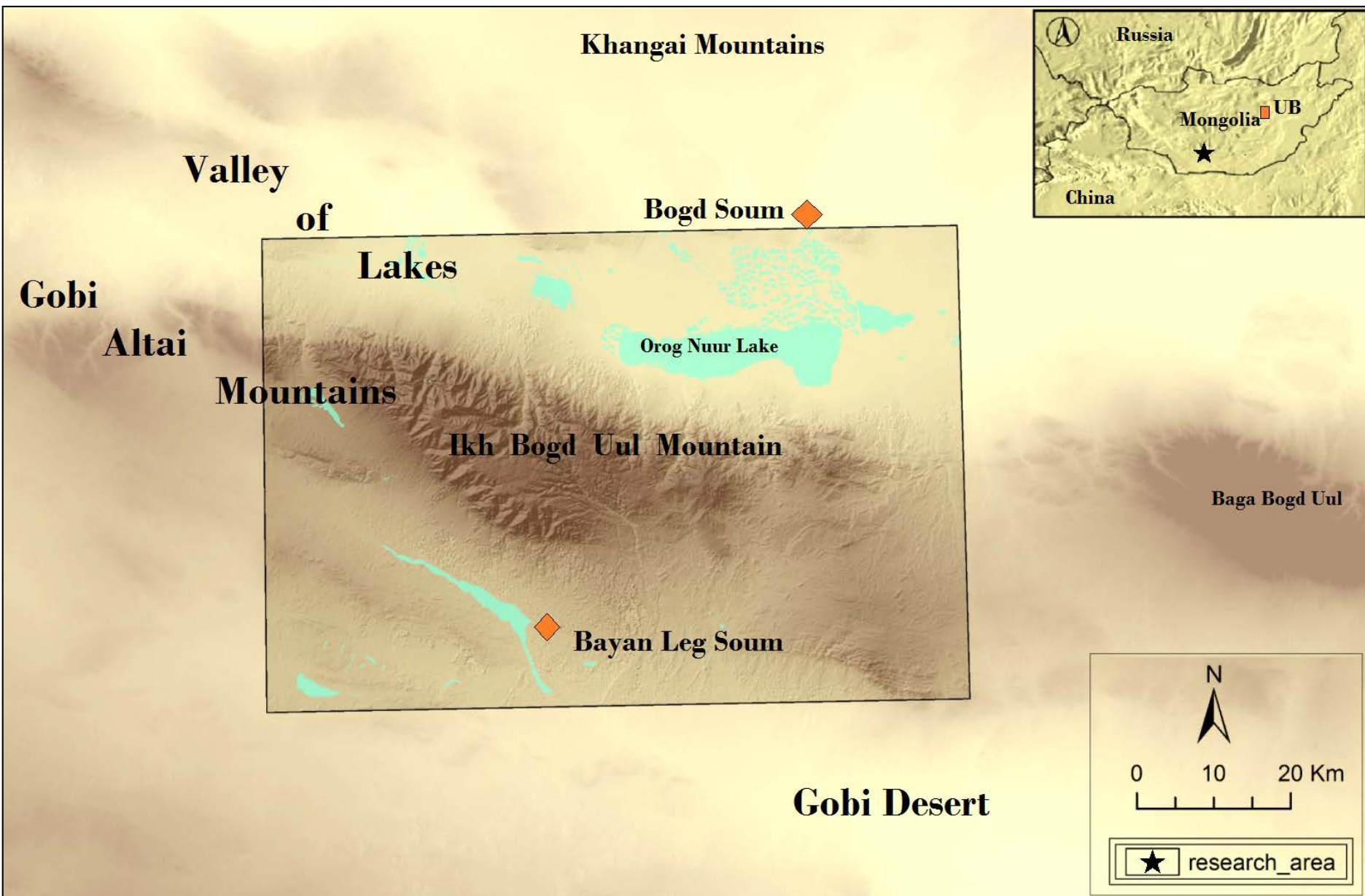
The flat mountaintop of Ikh Bogd Uul (3954 m), the Orog Nuur Lake and a pastoral autumn campsite, seen from the terraces of Tuyin Gol River





The Orog Nuur Lake and the eastern Valley of Lakes, seen from Tsonji Ovoo, one of the highest summit of Ikh Bogd Uul Mountain

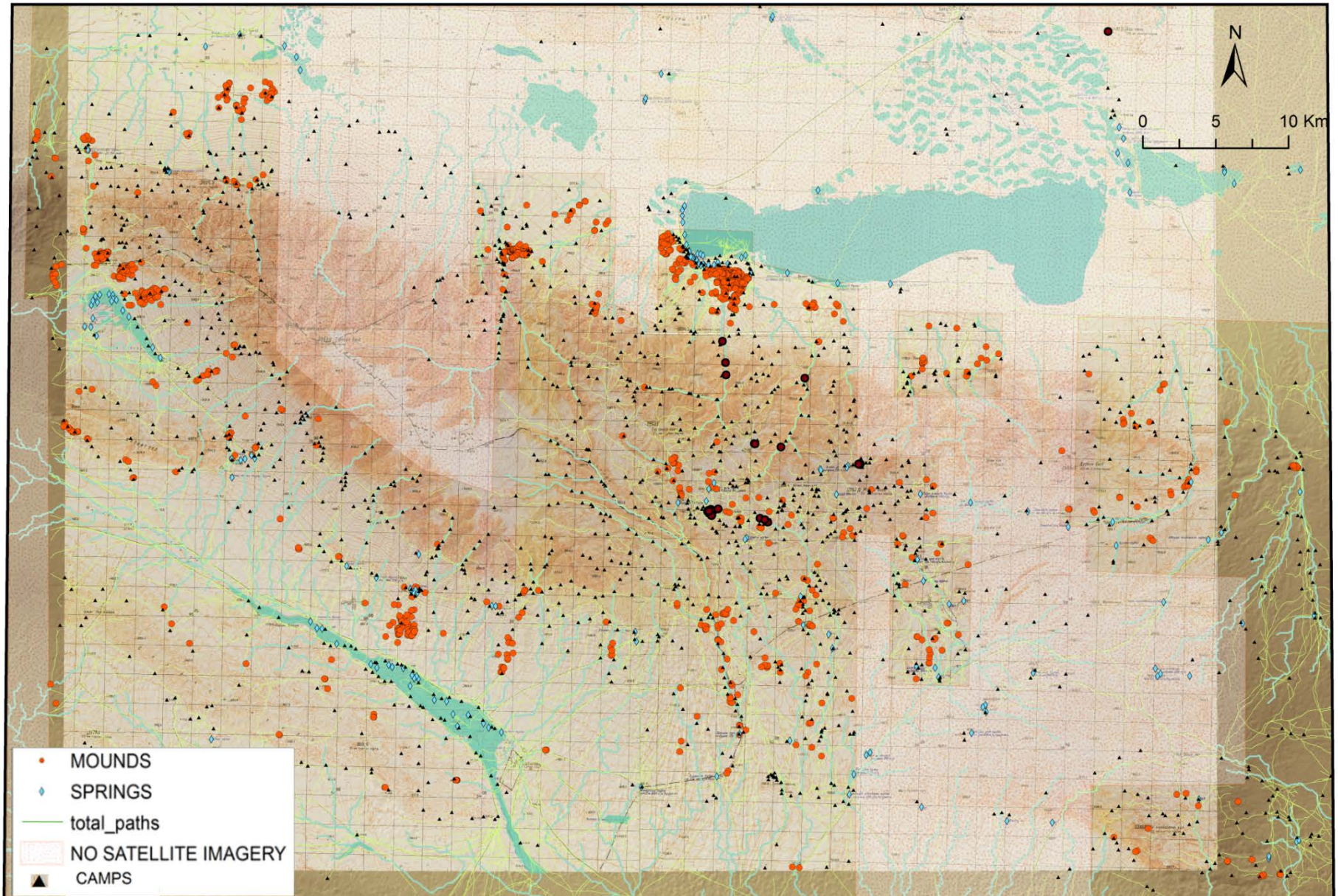




The research area (as considered in spatial analyses)

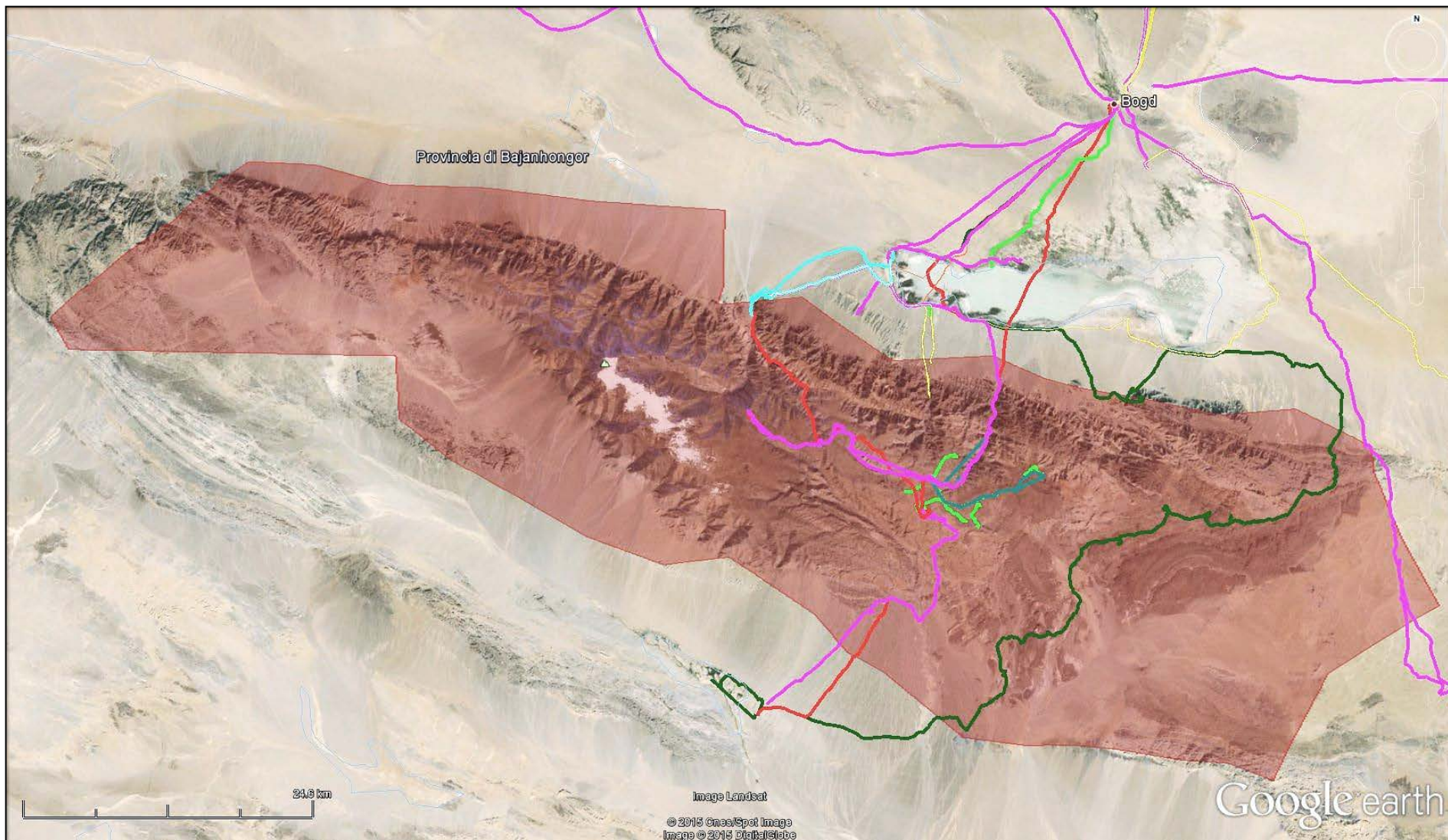


### 3. The research focus



Mounds, present herders' campsites and pastoral paths





Satellite Image of Ikh Bogd Uu, outline of the area of Natural Regional Park, and GPS tracks covered in the four fieldworks





Tsagaan Ovdog. Excavation of a small cluster of Bronze Age burials (foreground), next to a present herders' winter campsite (left), at the foot of Ikh Bogd Uul Mountain (in Marcolongo & al., 2005).





Late prehistoric mound re-arranged in the form of a *dirm*, for **signalising** purposes, with recent traces of offerings (bottles of vodka, food), usually performed at *ovoo* sites, at the entrance of Bituutein Am Valley, August 2011.



## 4. Methods and aims

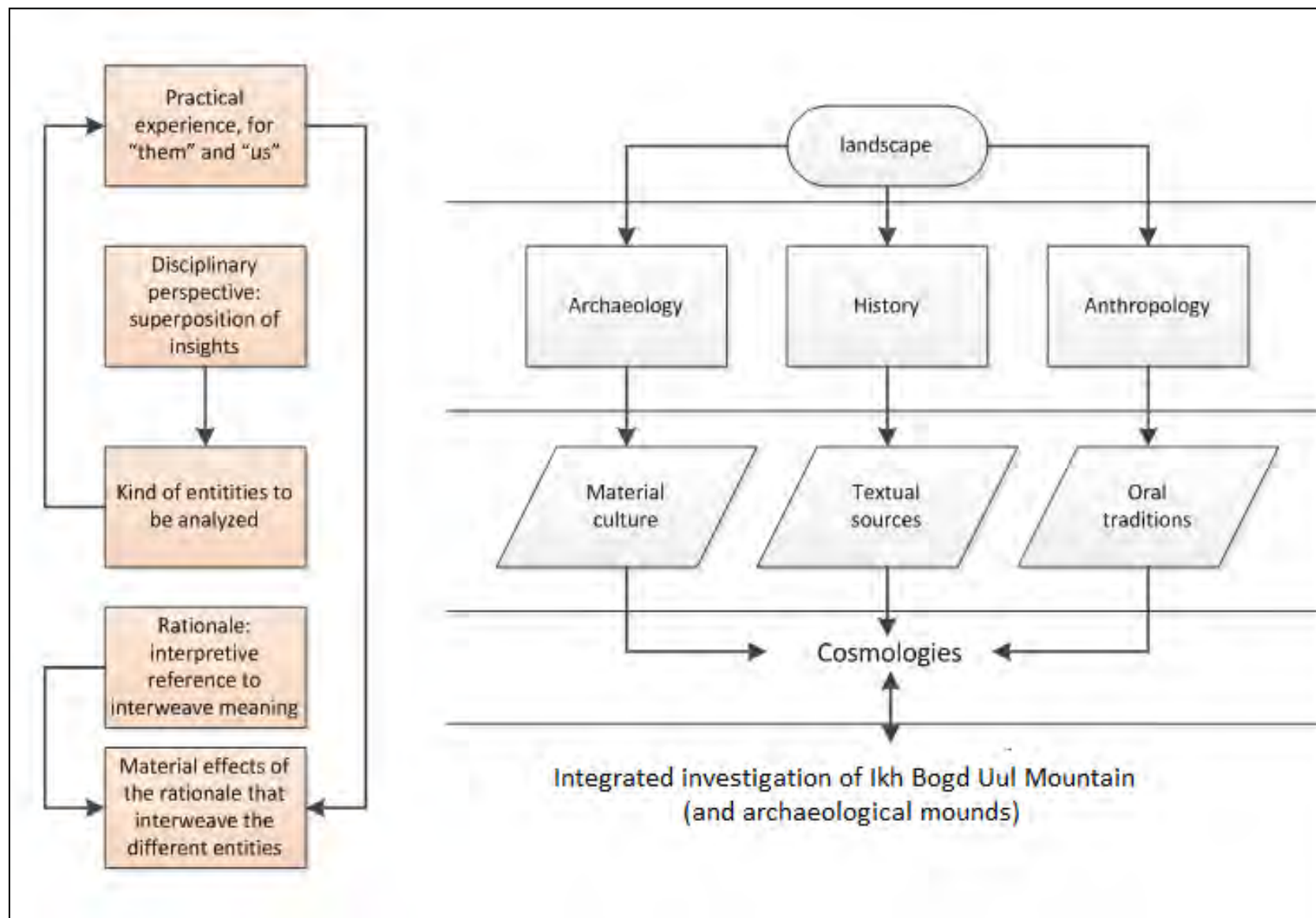


Young shepherds with their herd of cashmere goats, at the large necropolis of mounds SW of Orog Nuur Lake (background), August 2011.

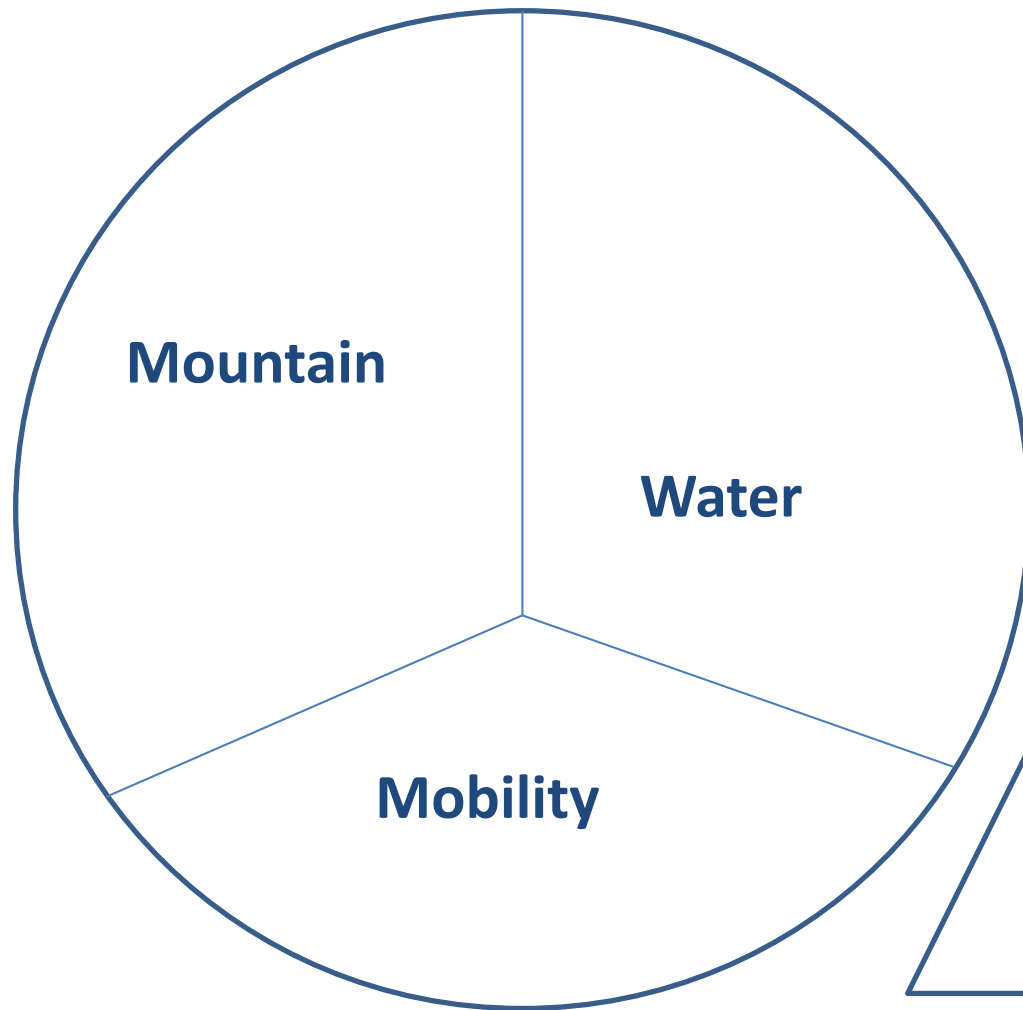




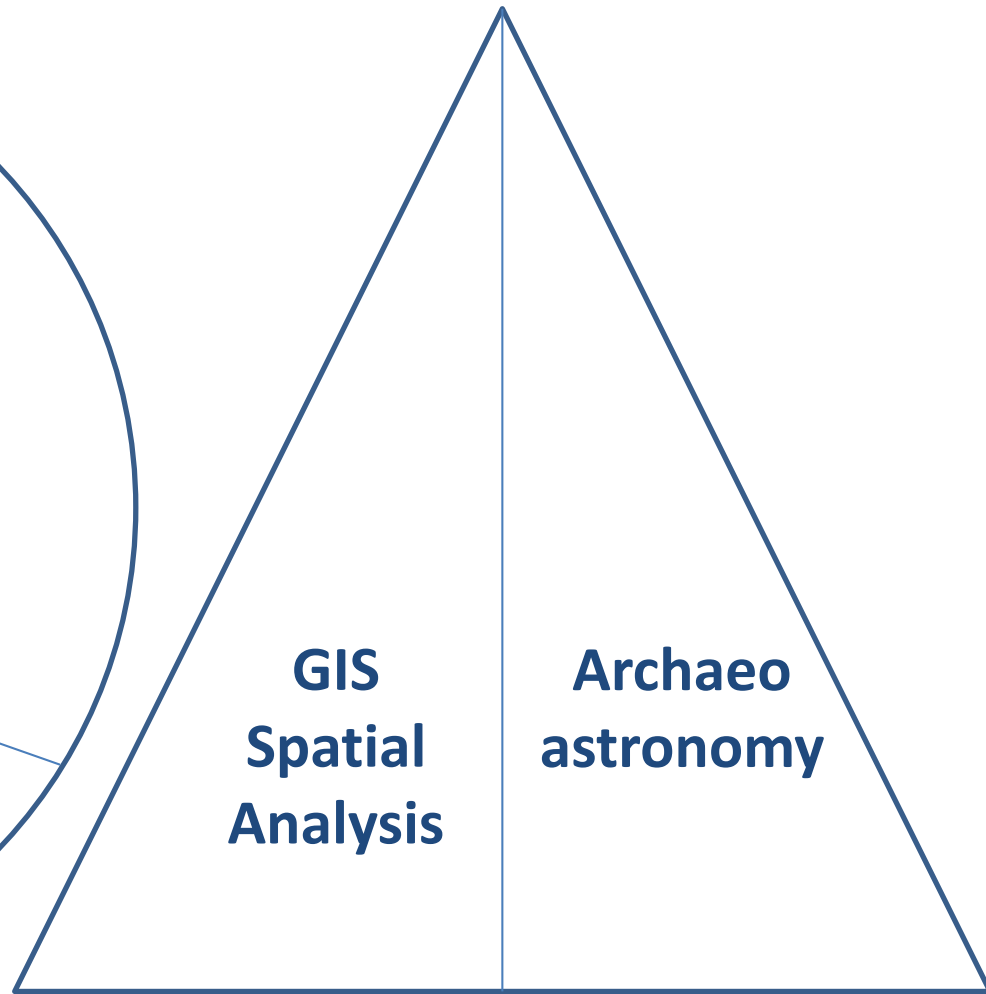




## 4. Themes and structures of the dissertation



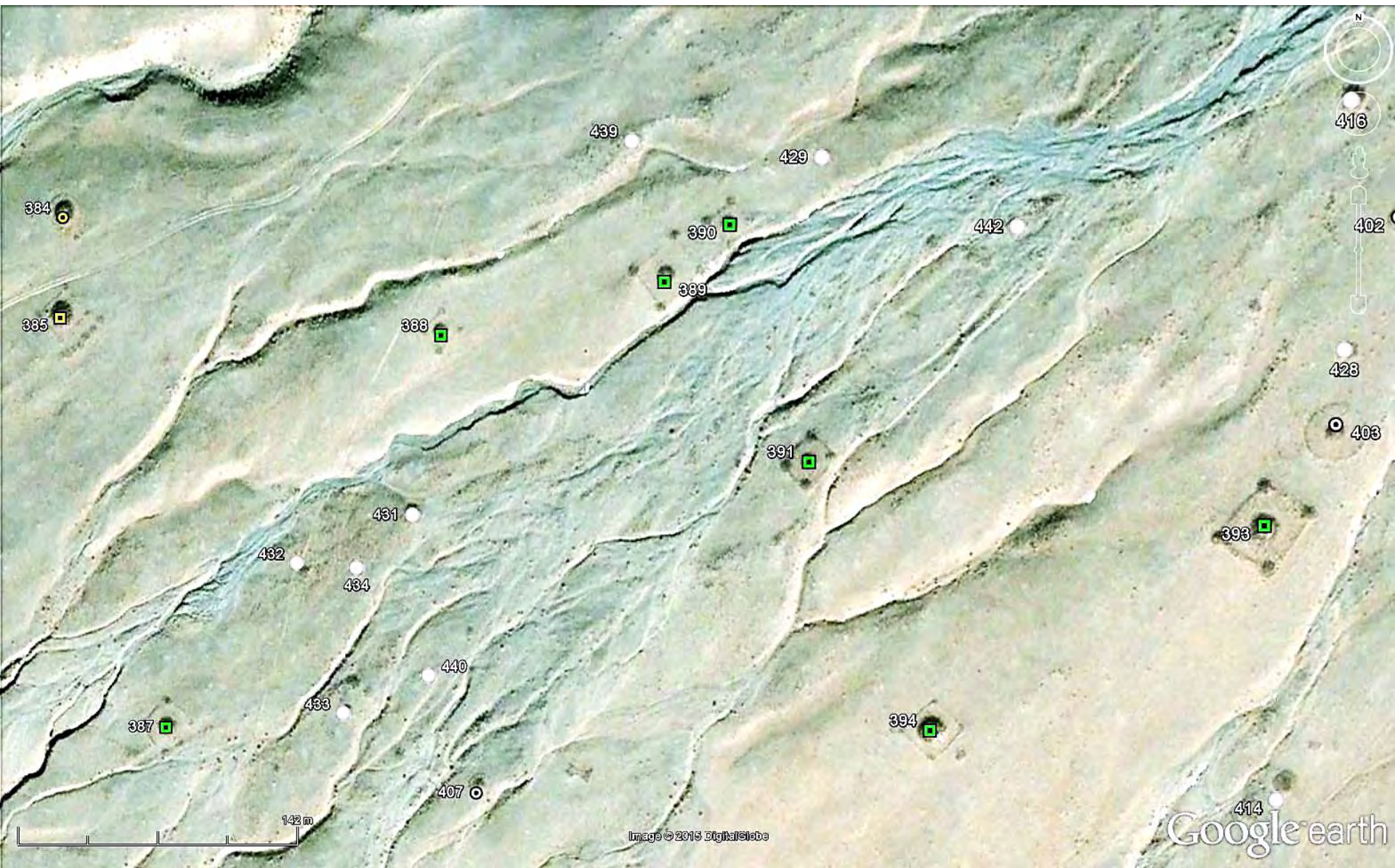
**Part 1:**  
**Analysis of ancient cosmologies  
and sacred geographies**



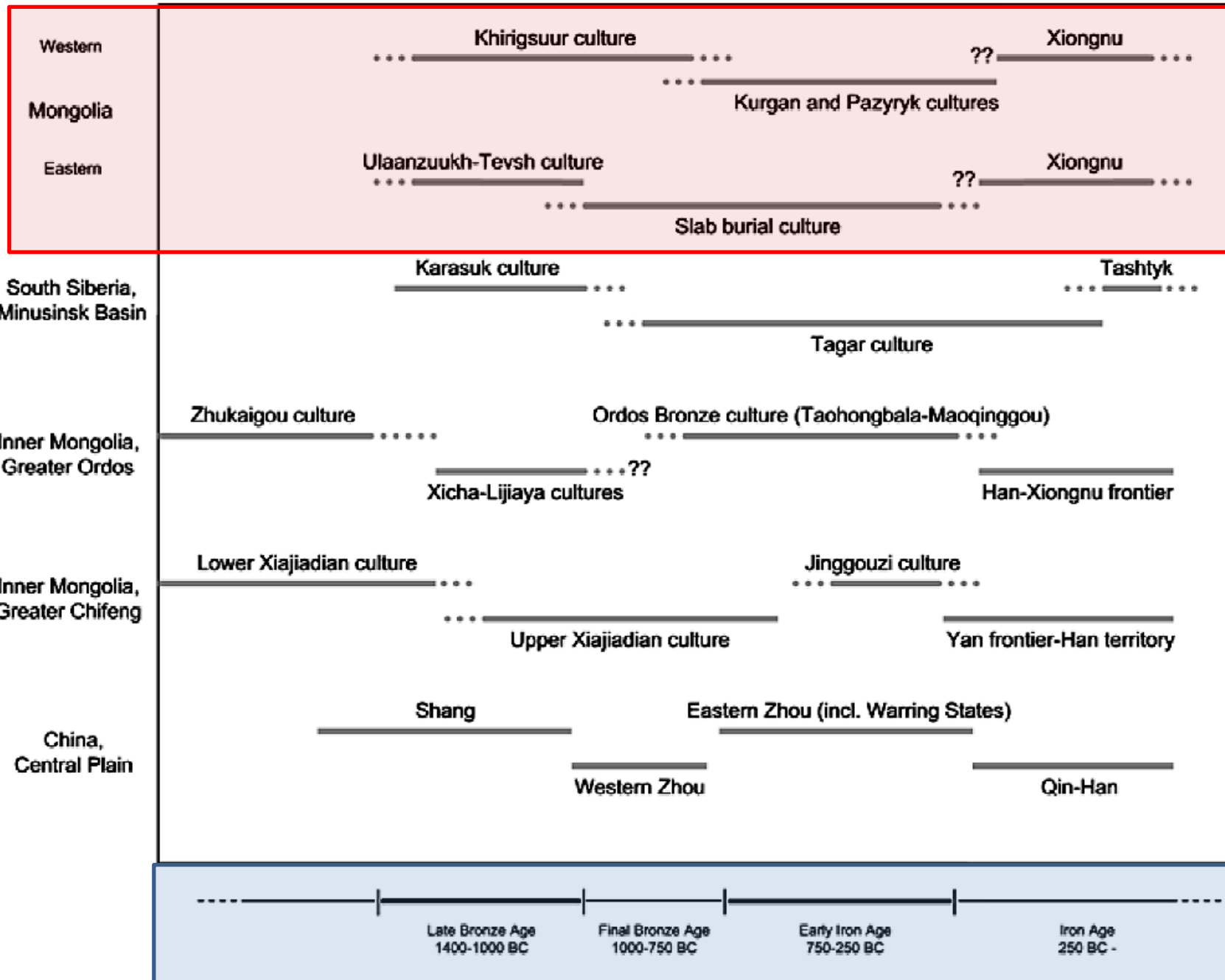
**Part 2: Quantitative analyses**



## 5. Late Prehistoric Mounds



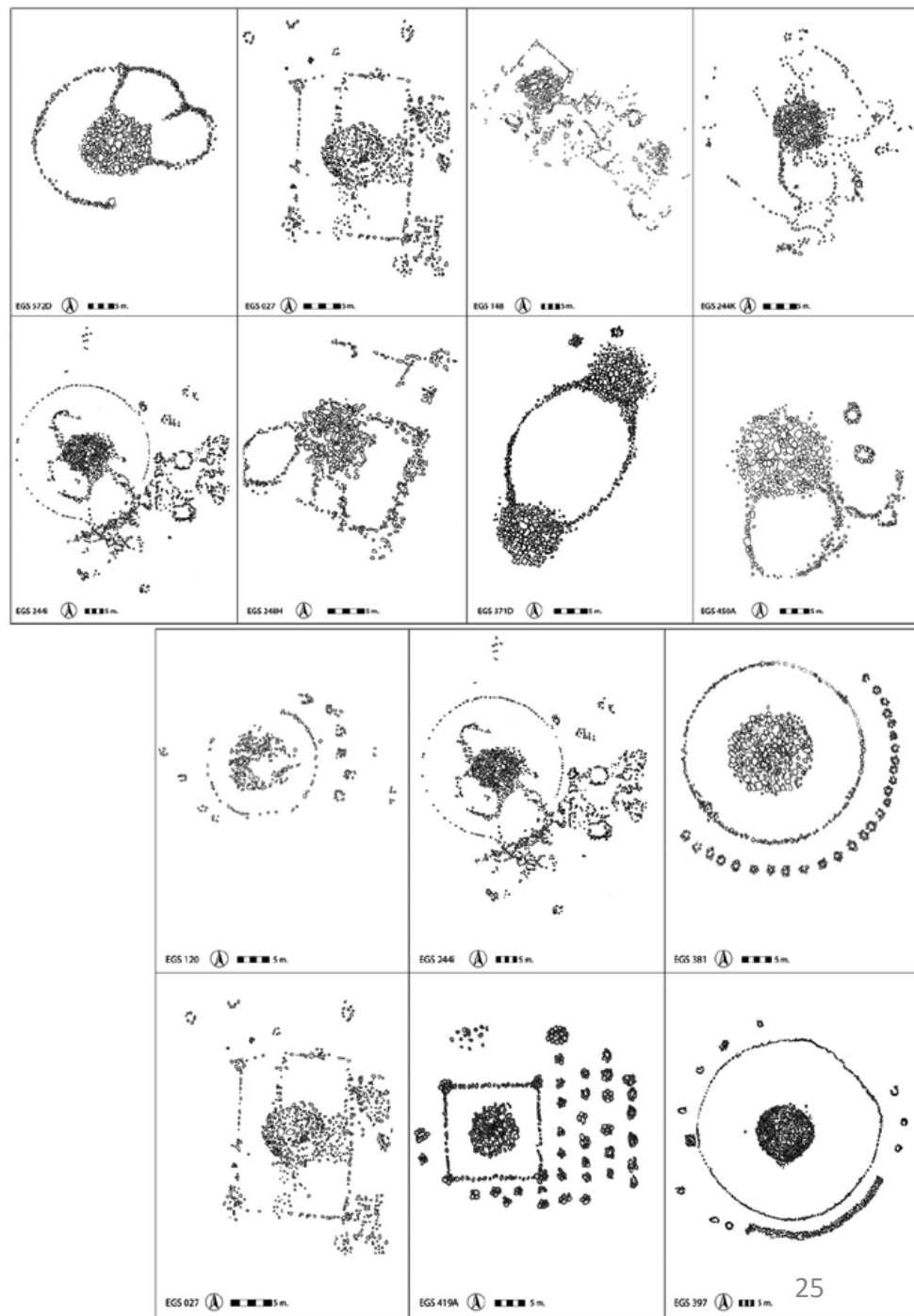
Some examples of the 1181 mounds documented on Ikh Bogd Uul, and visible in satellite imagery





## Mongolian *khirgsuur* mounds

Types of external arrangements of Late Bronze Age burials with squared or circular stone fence, and satellite features (Wright, 2007).







Late Bronze Age *khirigsuur* mound and West-Eurasian deer stone at the top of Puntsag Ovoo Hill, viewed from the east, with the local topographer Uirsaikh for scale. Ikh Bogd Uul Mountain, October 2009.





Burial mound of the necropolis between the northern slope of Ikh Bogd Uul Mountain and the SW shore of Orog Nuur Lake, excavated and reconstructed by the Institute of Archaeology of the Mongolian Academy of Sciences, August 2006.



## 6. Persistent cosmologies and layered sacred geographies



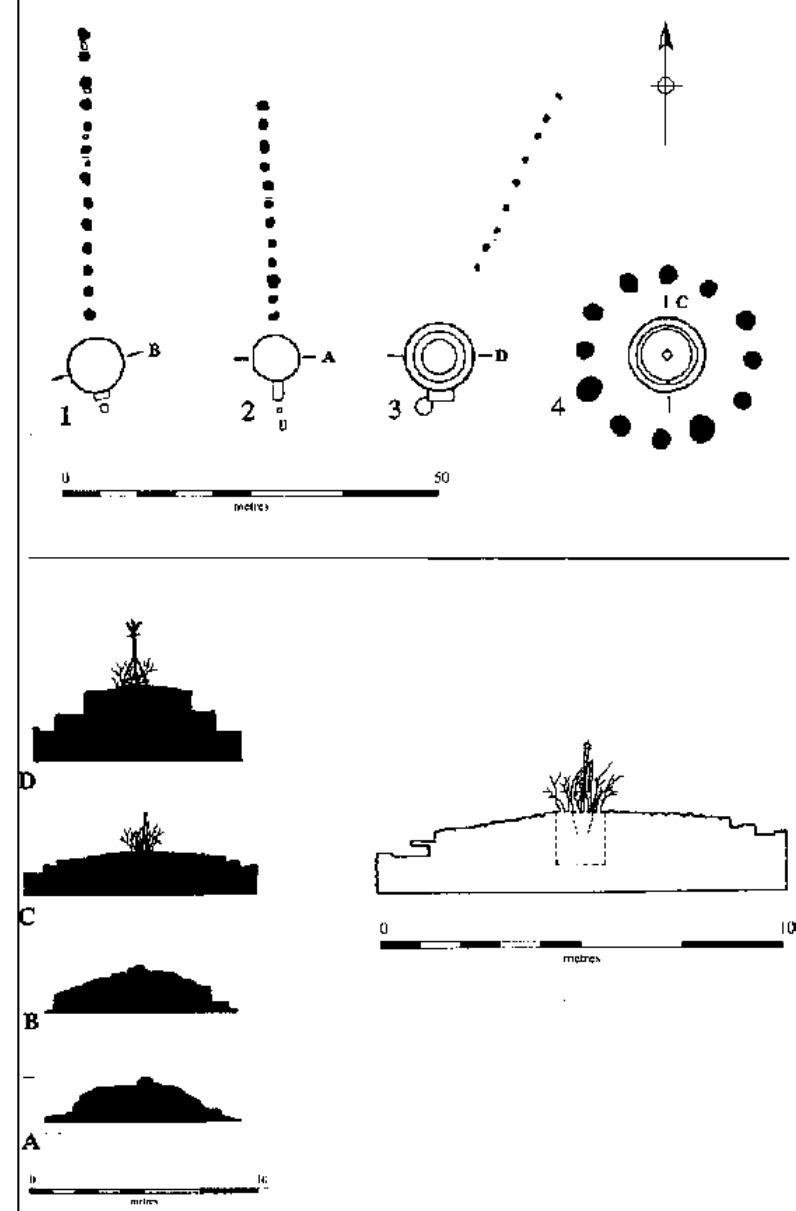
Traditional ovoo cairn, with vertical wooden poles, ritual *khadag* scarves and small offerings, Bogd Uul, Ulaanbaatar, October 2006.



**A****B**

**B**  
**Buddhist stupa,**  
with a gate opening to  
the East,  
and the mountain in the  
background,  
Bogd village





Row of 13 little cairns (*ovoos*) incorporating the deer stone on the top of Puntsag Ovoos Hill.

Comparative plans and elevations of buddhistized altars and rows of satellite oboos of 13, 12, 9 cairns in the 17<sup>th</sup> cent. AD monastery of Mergen, Inner Mongolia by Evans and Humphrey (2003: 202, Fig. 5).

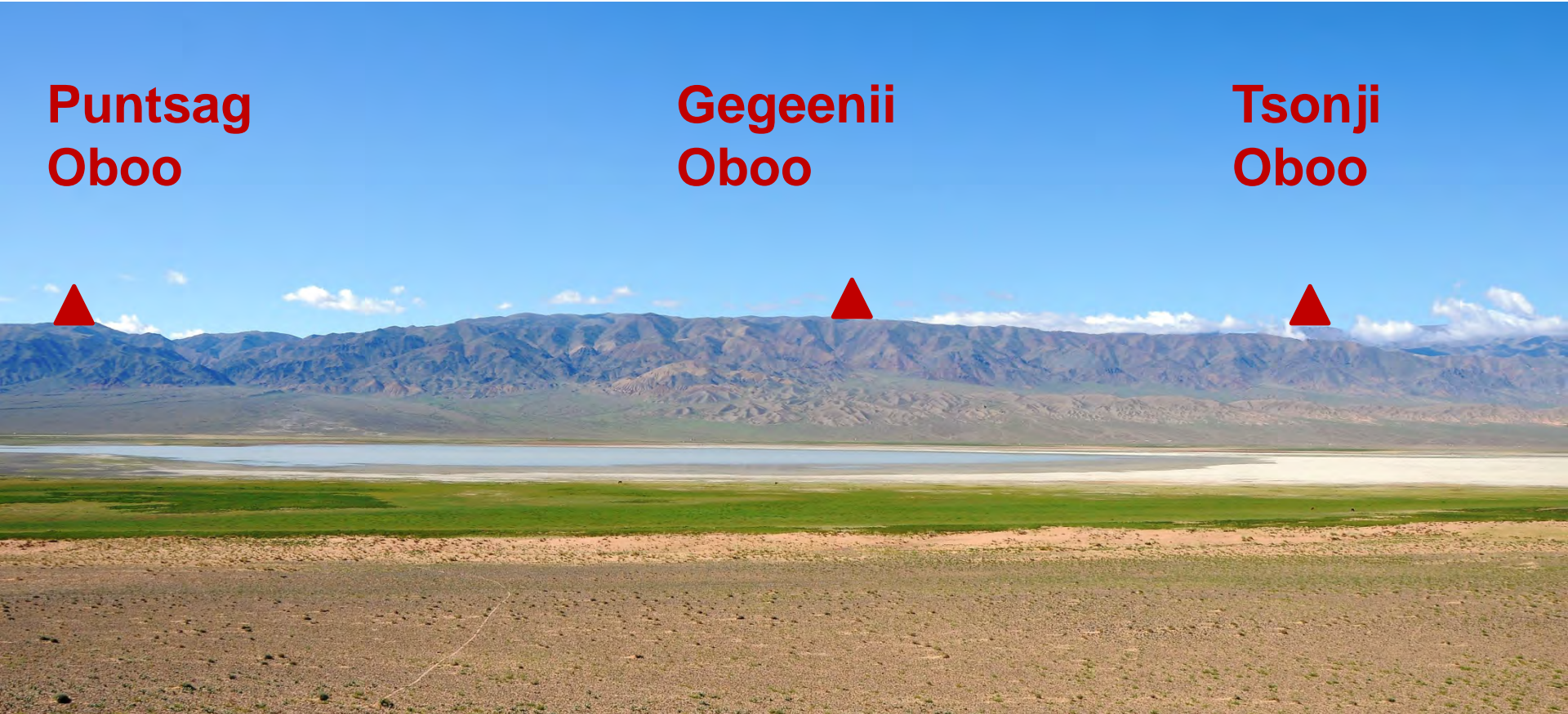


Changing sacred geographies: scheme of the local *buddhistisation* of three conspicuous hilltops of Ikh Bogd Uul Mountain

Puntsag  
Oboo

Gegeenii  
Oboo

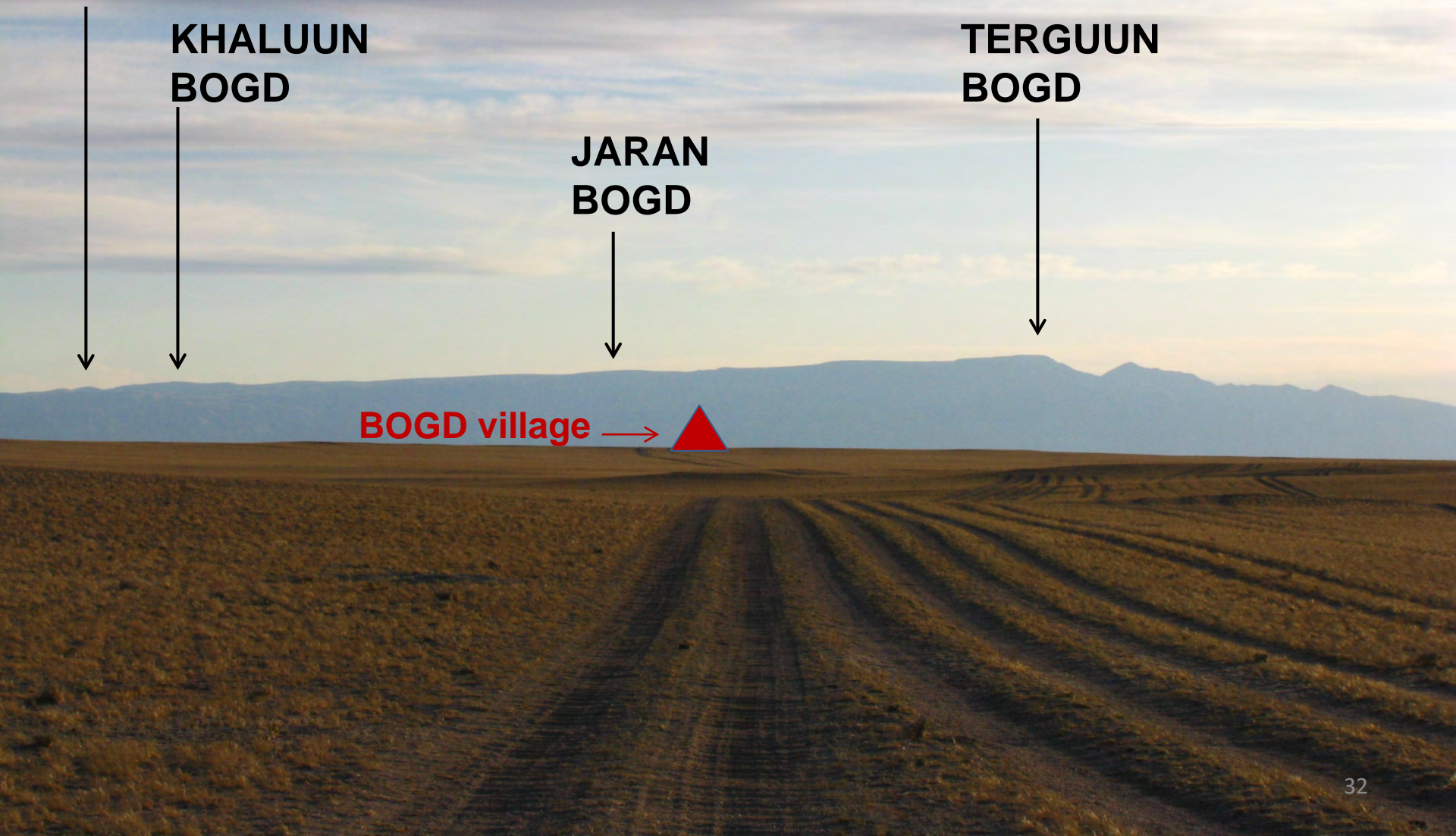
Tsonji  
Oboo





The scheme of mountaintops as the four guardian spirits of cardinal directions around a (sacred) centre: the village of Bogd.

## BARUUN BOGD





## 7. Water: symbolic and practical relevance

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Late prehistoric mound with a circular fence and Orog Nuur lake in the background, August 2006.



**Detail of a painting**  
**By Erdembileg D. (2010),**  
**“Like a mountain”,**  
**Mongolian National Galley**  
**of Modern Art, Ulaanbaatar,**  
**November 2010.**  
Representation of the  
Mongolian concept of sacred  
homeland.  
Protective, ancestral  
mountains spirits, overlooking  
a river and a pastoral  
campsite.



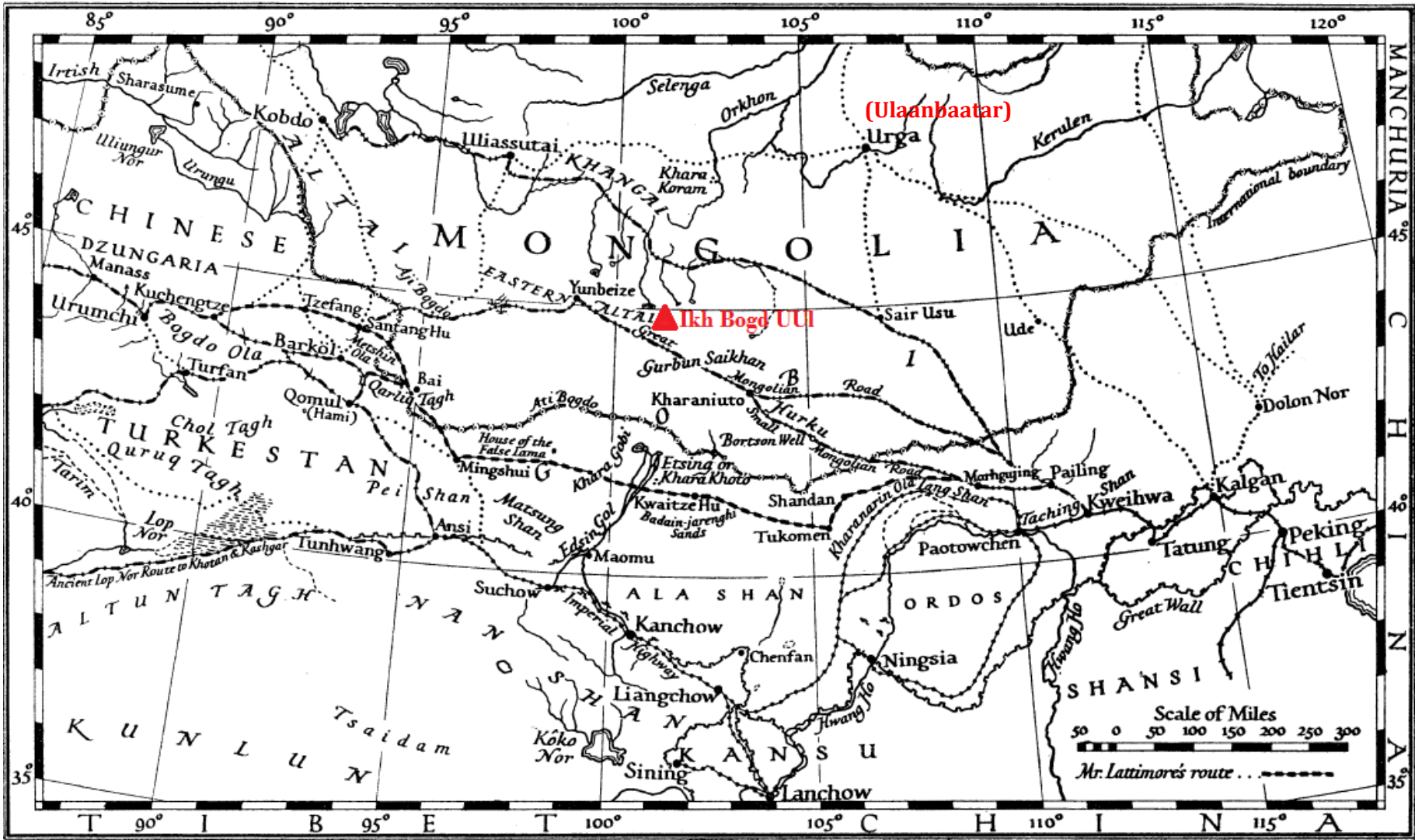




Ovoo of **Kharztai Rashaan**, a medicinal spring for gastric diseases SW of Orog Nuur Lake, at the foot of Ikh Bogd Uul Mountain, August 2011.

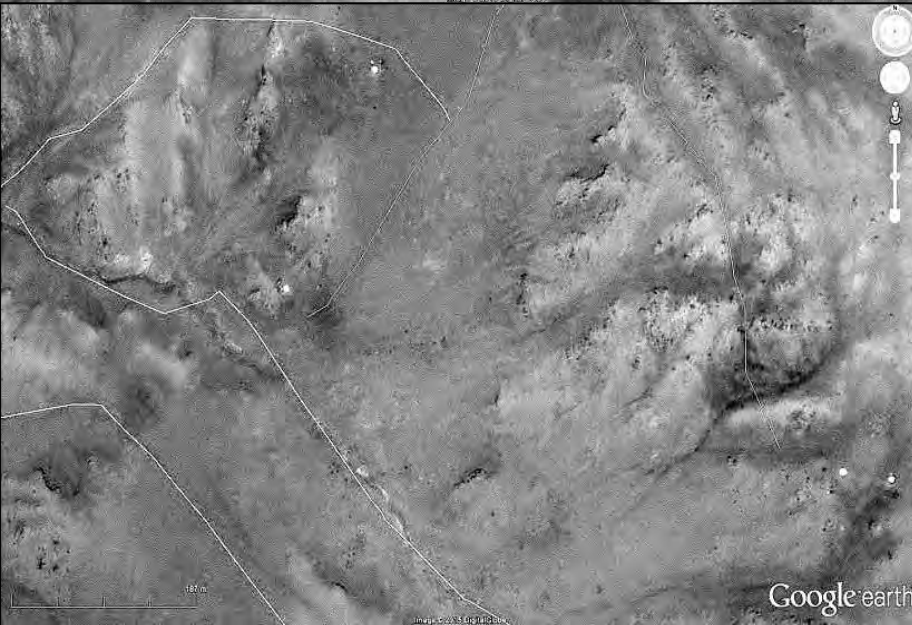


# 8. Mobility: long distance routes and pastoral paths



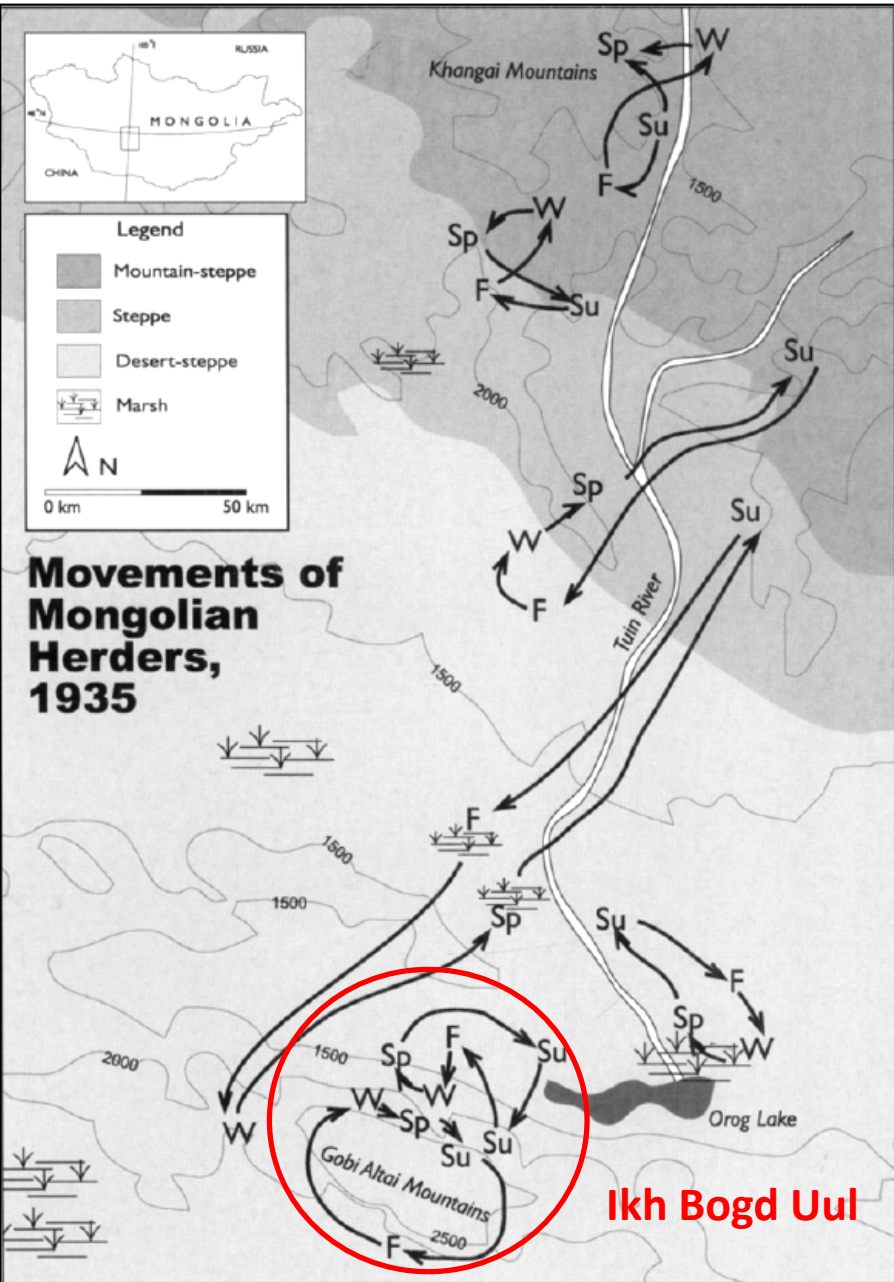
Caravan routes of Mongolia and Central Asia in early 20<sup>th</sup> century, in Lattimore (1928: 503).





**Examples of herders' campsites and pastoral paths documented on Ikh Bogd Uul Mountain, thanks to Google Earth satellite imagery**



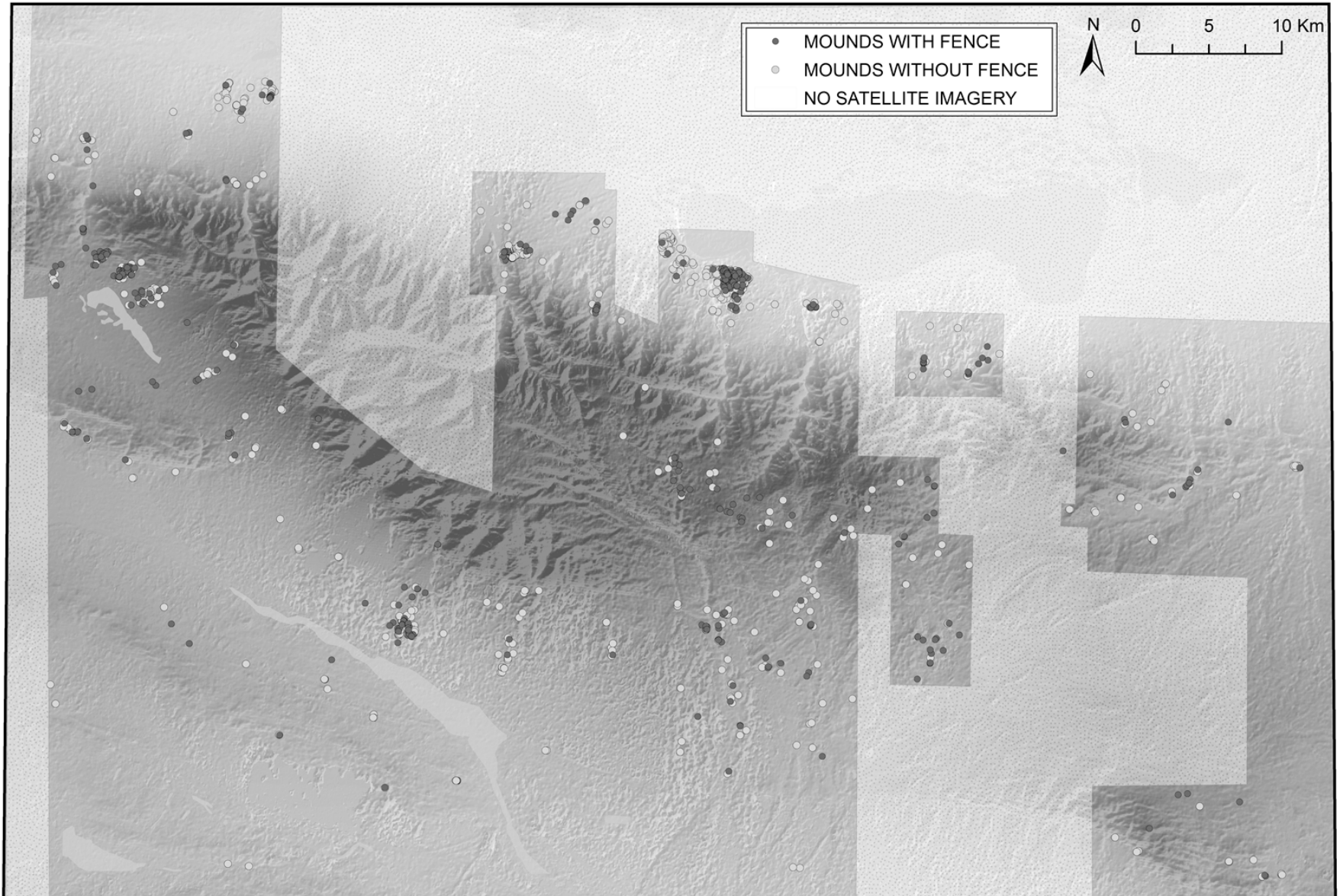


Pattern of traditional pastoral shifts between Ikh Bogd Uul and Khangai Mountains in Winter (W), Spring (Sp), Summer (Su) and Autumn (F). In Fernandez-Gimenez (1999), after Simukov (1935).

FIG. 4—Seasonal movement patterns of the major groups of herders identified by A. D. Simukov in 1935 in the former Erdene Bandidaagiin Khotagiin Khoshuun, Mongolia. Sources: Simukov 1993; base map adapted from *Bayankhongor Aimag Atlas* 1989, 7, 14.

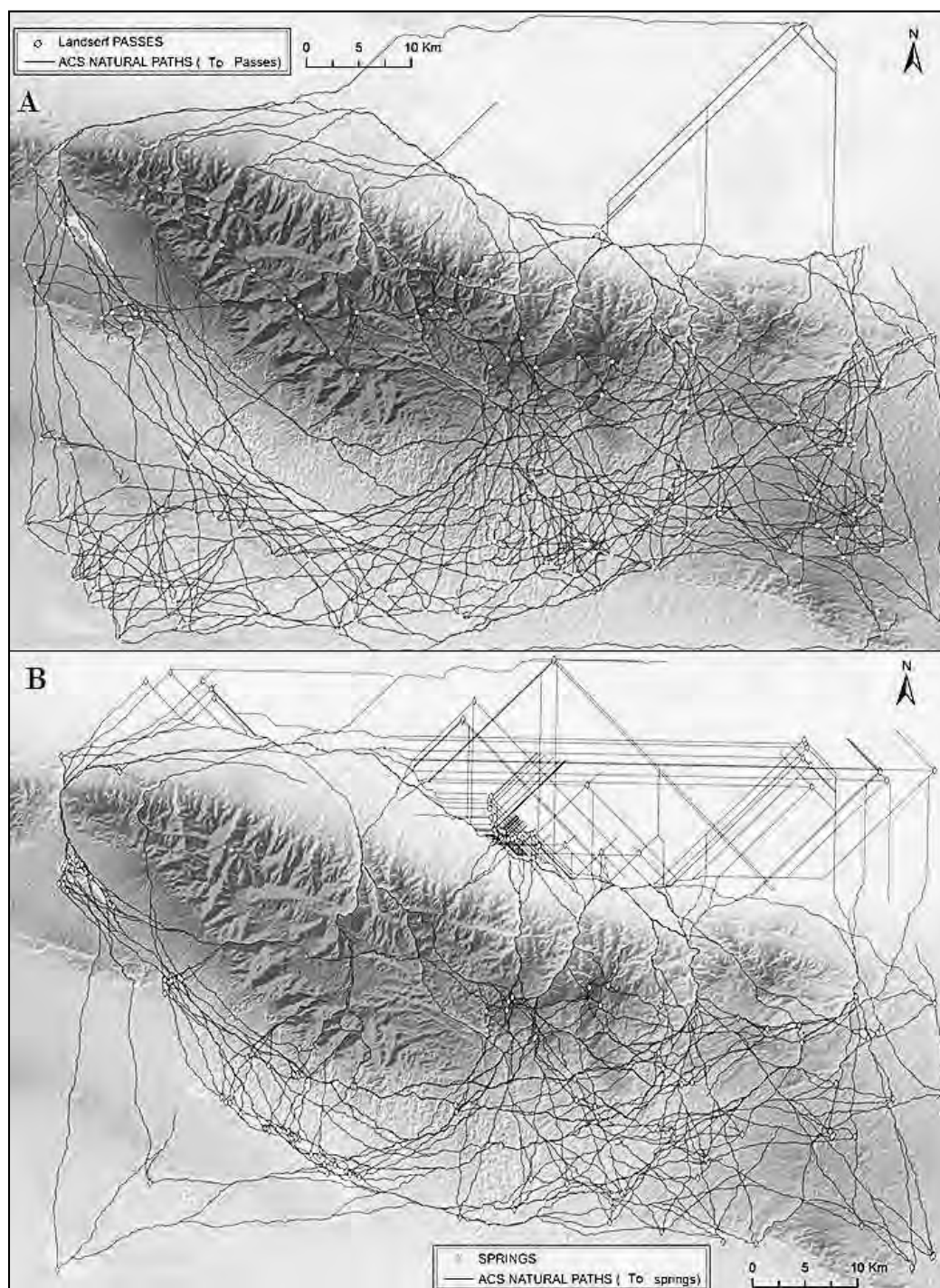


## 9. Persistent landscapes and spatial analysis



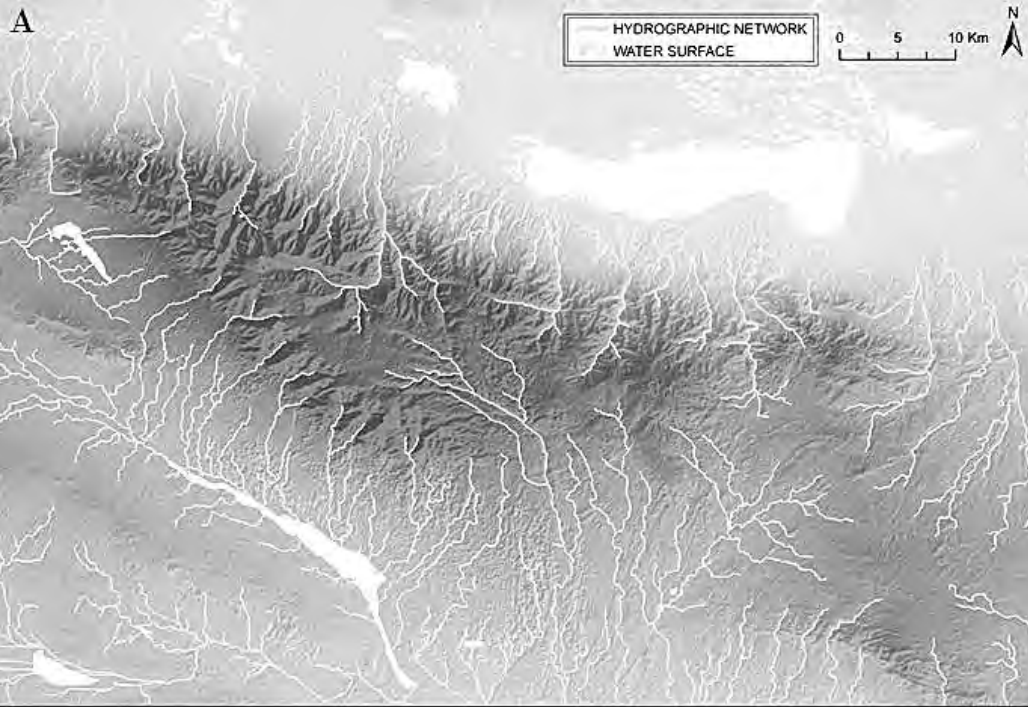
Map of fenced (373) and unfenced (806) mounds, positioned through satellite images and fieldwork.



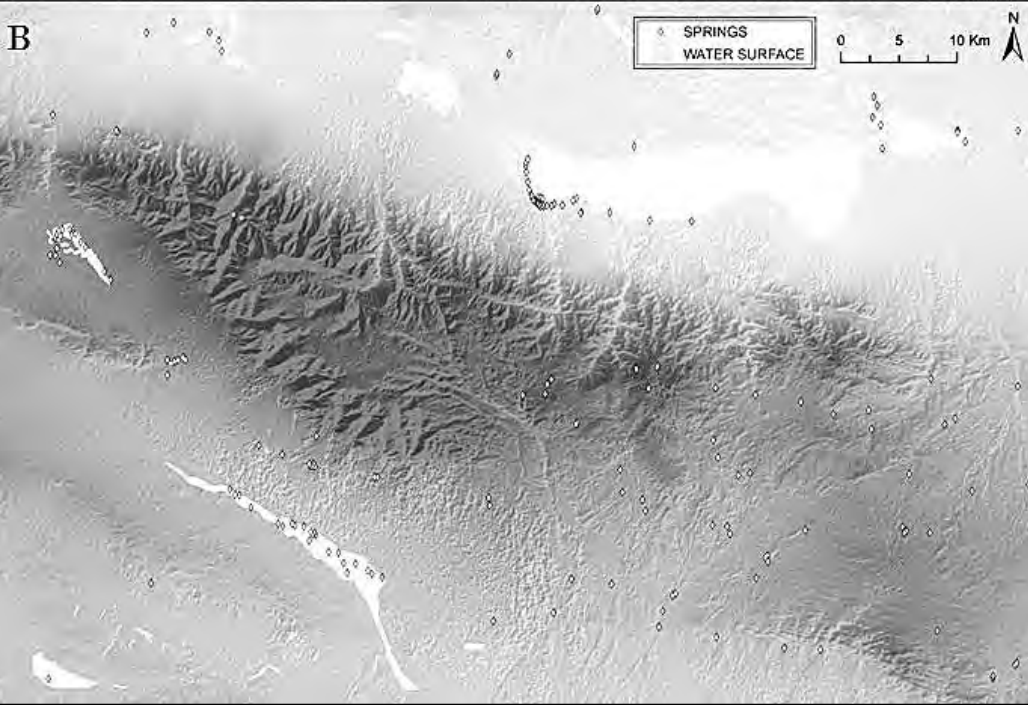


**Mathematically calculated  
(ACS) natural paths to  
Landserf mountain passes (A)  
and to modern springs and wells (B)  
as destination points.**

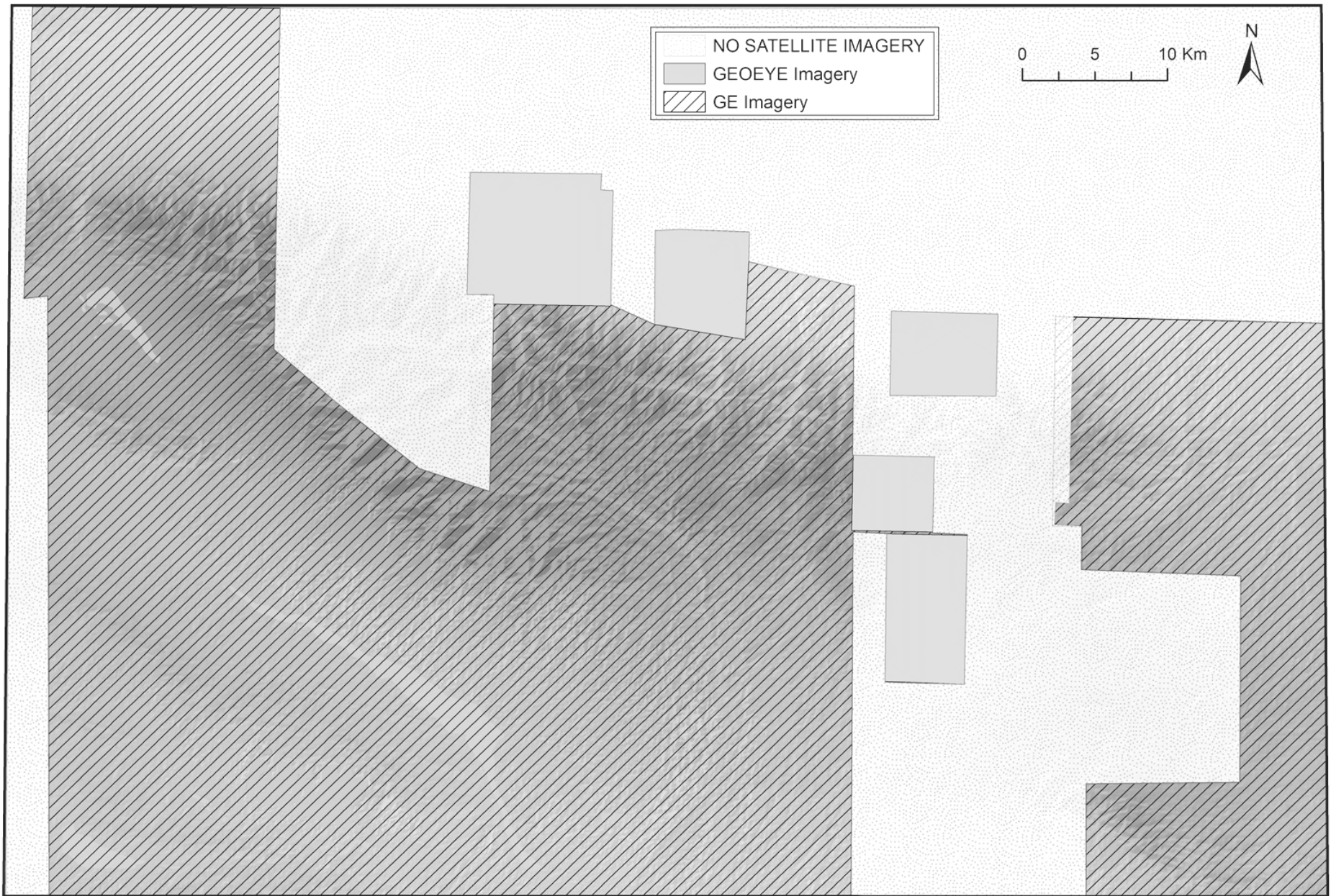




**Calculated hydrography (A),  
and location of modern springs and wells (B)  
in the research area**

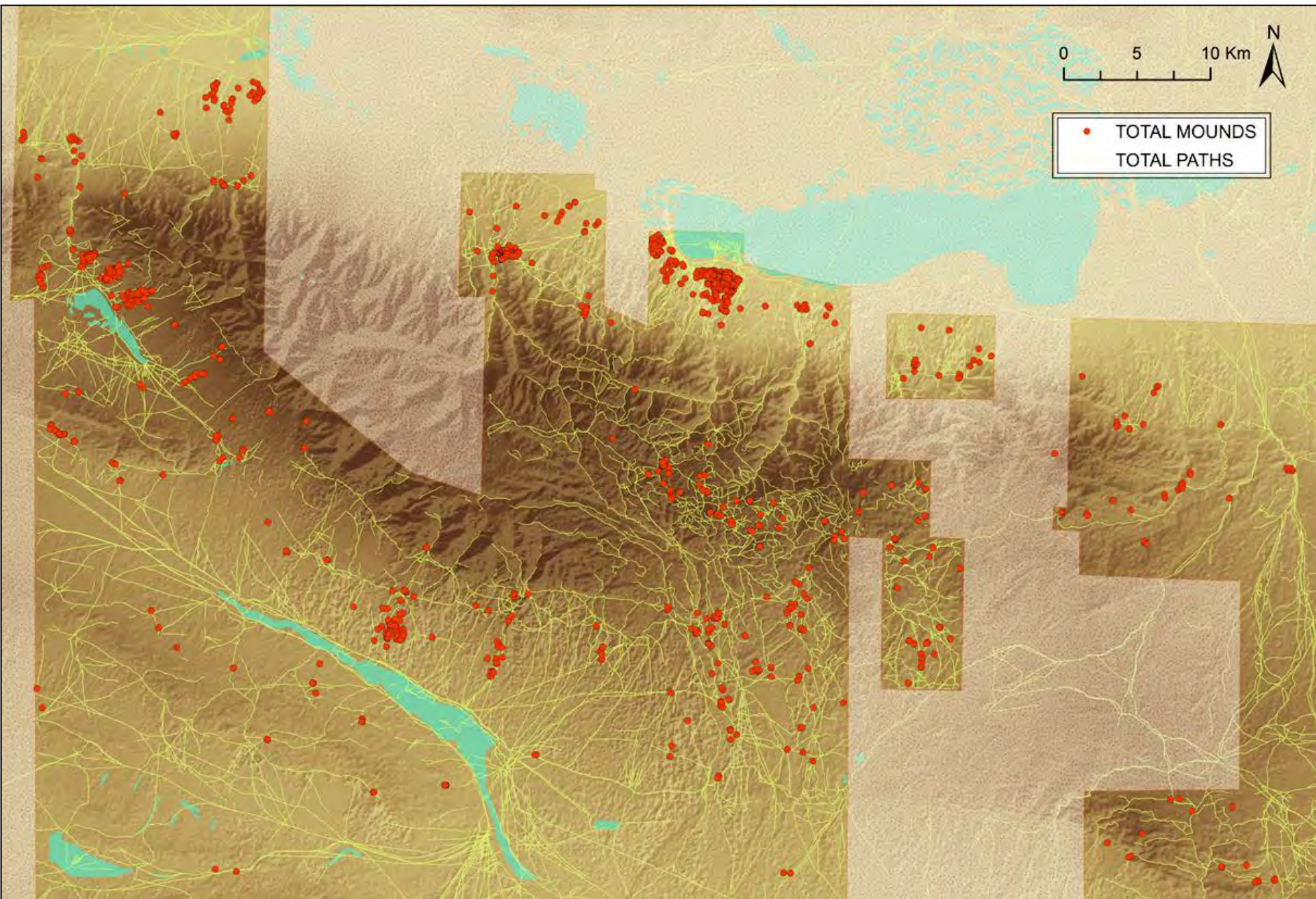






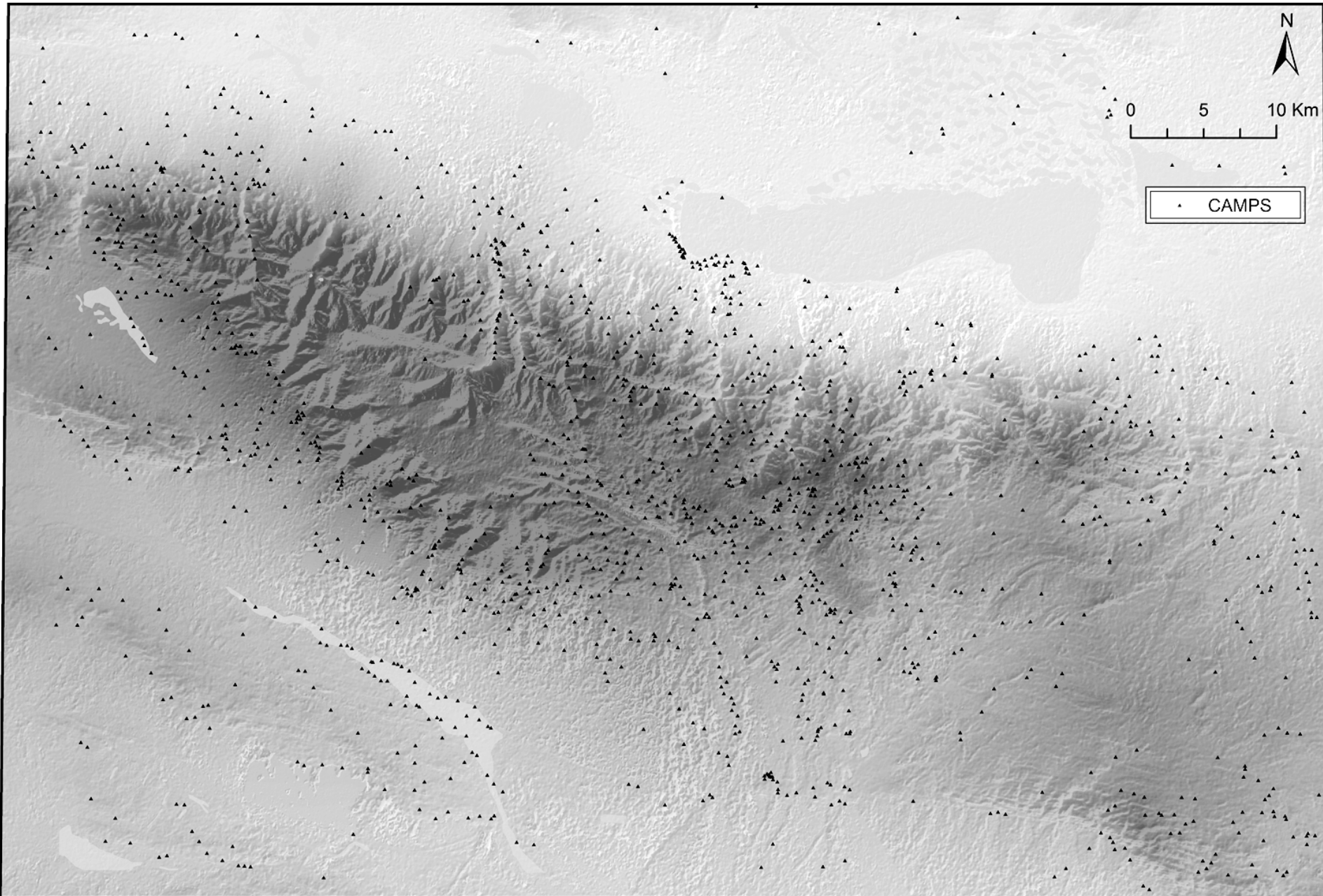
**Portion of the research area covered (and uncovered) by Google Earth satellite imagery, and outline of acquired GeoEye satellite images.**





**Map of digitalised, modern pastoral paths and ancient burial mounds on Ikh Bogd Uul Mountain**





**Map of herders' campsites localised on Ikh Bogd Uul Mountain, and positioned thanks to Russian-Mongolian cartography and satellite imagery.**



## Calculations of spatial proximity

<b>MOUNDS connected (NEAR) to</b>	<b>MOBILITY NETWORK</b>
MOUNDS (Fenced/Bronze Age)	Digitalized-modern Paths (Total Paths)
MOUNDS (Not fenced/Iron Age)	Digitalized-modern Paths (Total Paths)
MOUNDS (Total)	Digitalized-modern Paths (Total Paths)
MOUNDS (Fenced/Bronze Age)	Digitalized-modern First rank paths
MOUNDS (Not fenced/Iron Age)	Digitalized-modern First rank paths
MOUNDS (Total)	Digitalized-modern First rank paths
MOUNDS (Fenced/Bronze Age)	Digitalized-modern Second rank paths
MOUNDS (Not fenced/Iron Age)	Digitalized-modern Second rank paths
MOUNDS (Total)	Digitalized-modern Second rank paths
MOUNDS (Fenced/Bronze Age)	ACS mathematically calculated paths to LANDSERF mountain passes
MOUNDS (Not fenced/Iron Age)	ACS mathematically calculated paths to LANDSERF mountain passes
MOUNDS (Total)	ACS mathematically calculated paths to LANDSERF mountain passes
MOUNDS (Fenced/Bronze Age)	ACS mathematically calculated paths to modern WATER springs and wells.
MOUNDS (Not fenced/Iron Age)	ACS mathematically calculated paths to modern WATER springs and wells.
MOUNDS (Total)	ACS mathematically calculated paths to modern WATER springs and wells.
<b>MOUNDS connected to</b>	<b>WATER points (SPRINGS and WELLS)</b>
MOUNDS (Fenced/Bronze Age)	Modern water springs and wells
MOUNDS (Not fenced/Iron Age)	Modern water springs and wells
MOUNDS (Total)	Modern water springs and wells
<b>MOUNDS connected to</b>	<b>WATER lines (hydrography)</b>
MOUNDS (Fenced/Bronze Age)	Calculated hydrography (river or torrent lines)
MOUNDS (Not fenced/Iron Age)	Calculated hydrography (river or torrent lines)
MOUNDS (Total)	Calculated hydrography (river or torrent lines)

Table of spatial calculations to paths, springs and hidrography performed in ArcGIS10.



## Statistical calibration

### Test of Kolmogorov-Smirnov

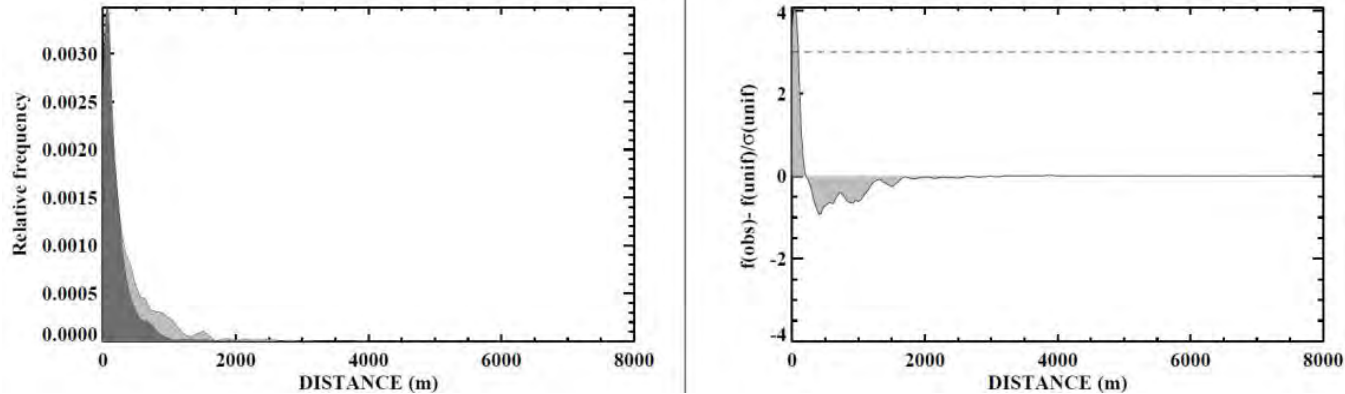
Mounds	Distance	Probability (p-value)
Mounds vs. Random 1	0.1397	$1.537 \times 10^{-10}$
Mounds vs. Random 2	0.1304	$3.014 \times 10^{-9}$
Mounds vs Random 3	0.1228	$3.090 \times 10^{-8}$
Random 1 vs. Random 2	0.0296	0.6713
Random 1 vs. Random 3	0.0297	0.6712
Random 2 vs. Random 3	0.0508	0.0919

Table showing the value of spatial distribution (Distance) and the probability of mounds in comparison with three datasets of random points, and the consistency of the randomness of the three samples of random points (bottom).

# Statistical calibration

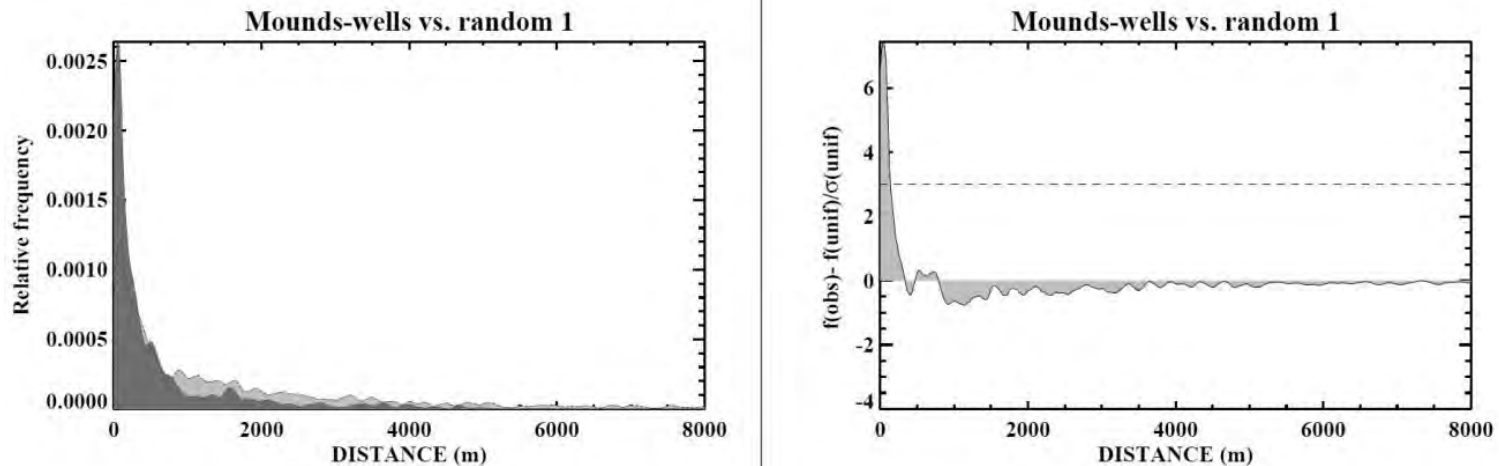
## Examples of relative frequency and of comparison with random datasets

### Relative frequency of distance from mounds to **digitalised paths**



**Relative frequency** (left) and normalized relative frequency (right) of the distance from mounds to Total digitalised paths, compared to a uniform dataset (Random 1) in light grey.

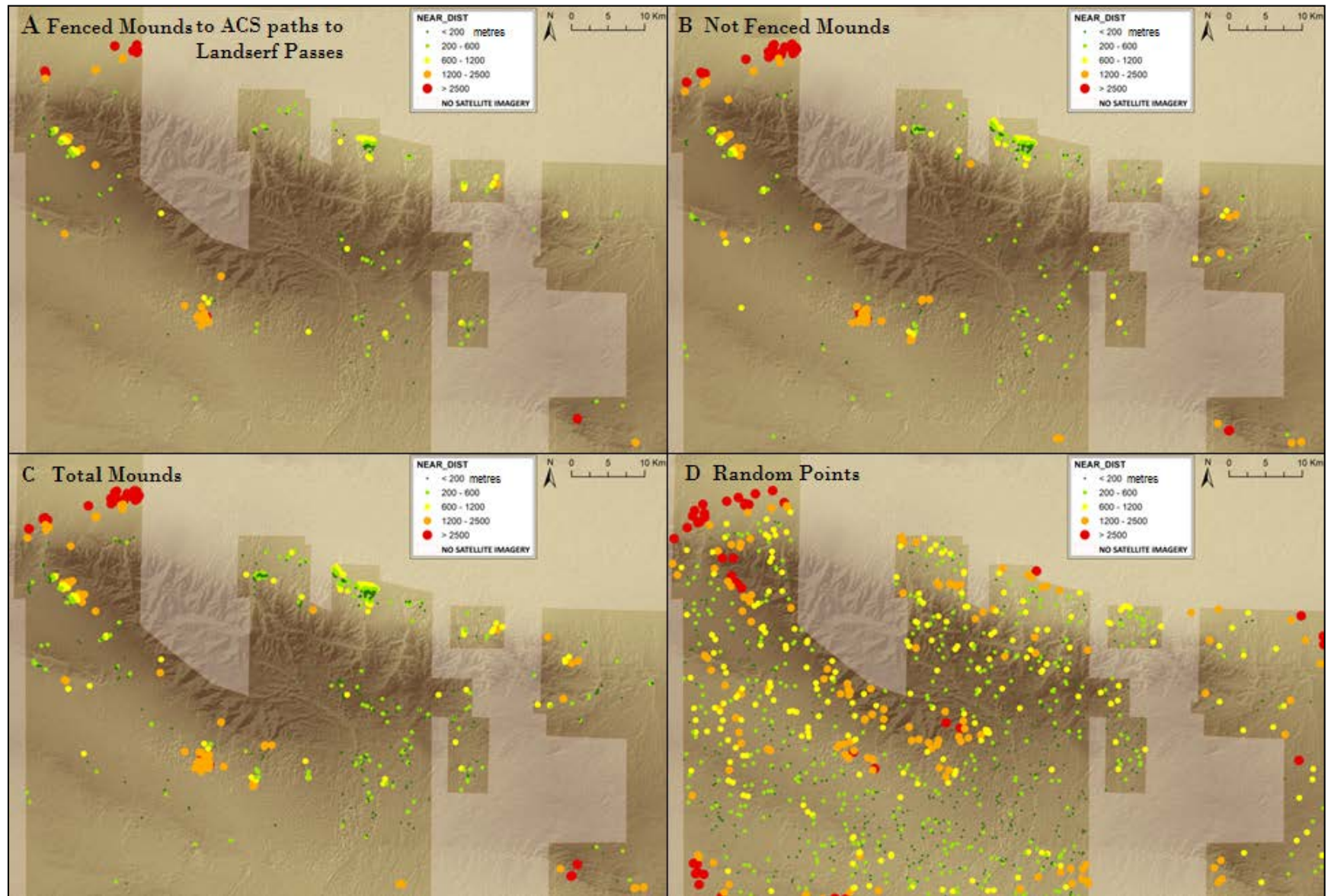
### Relative frequency of distance from mounds to **natural ACS paths to modern springs**



**Relative frequency** (left) and normalized relative frequency (right) of the distance from mounds to natural paths to springs, compared to a uniform dataset (Random 1) in light grey.

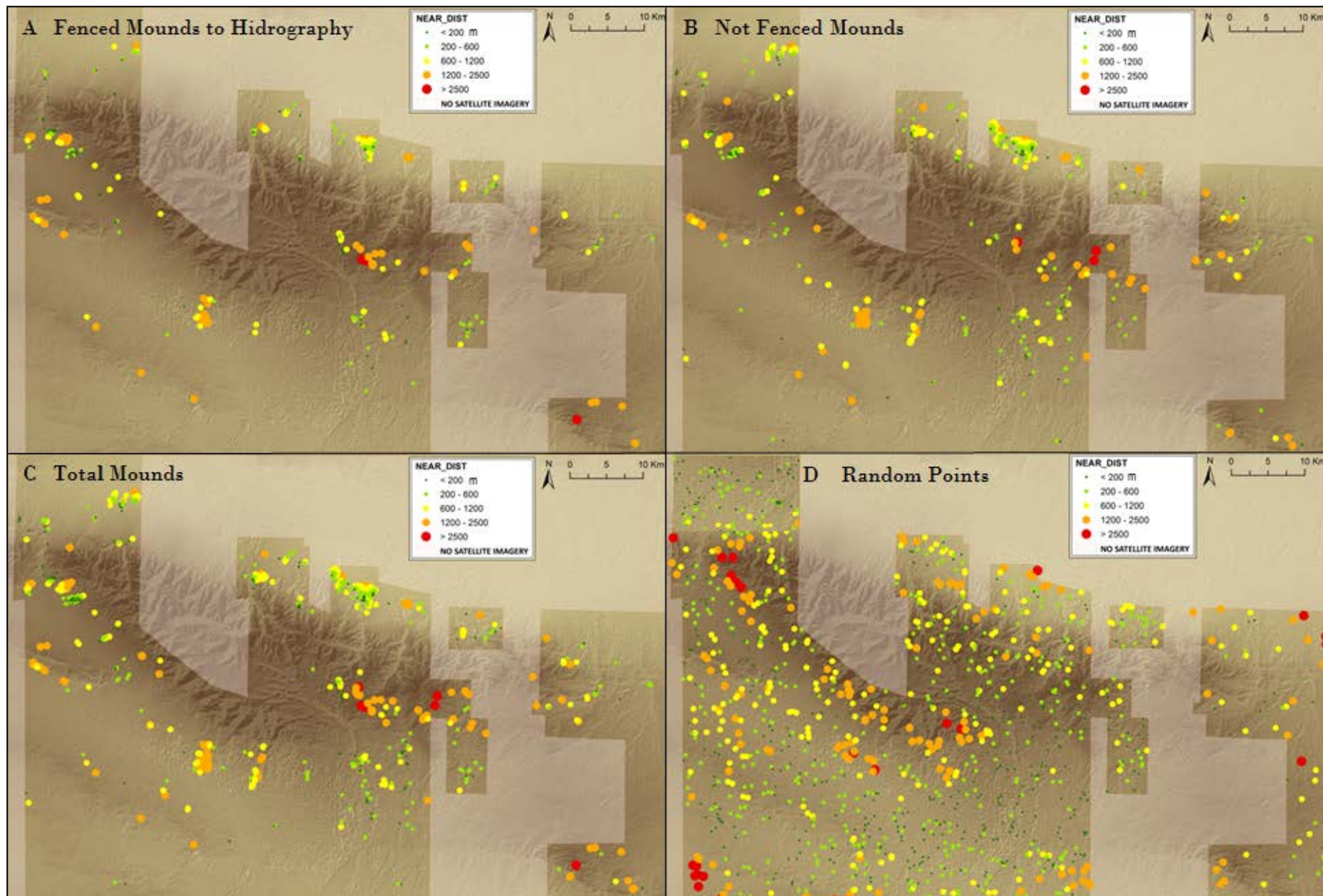


## 10. Results of spatial analyses



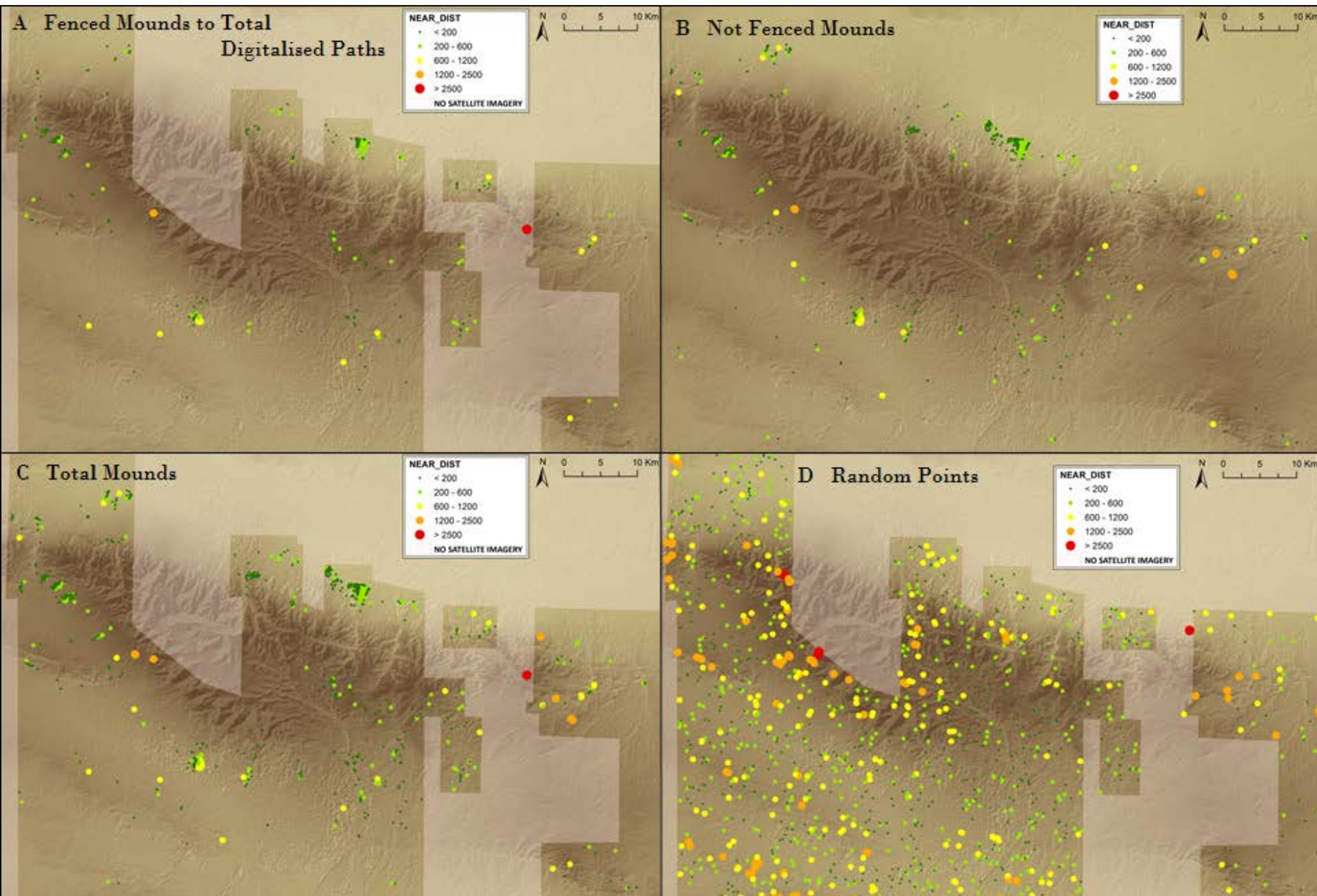
Thematic maps of the calculated distance from each mound to the closest NATURAL PATHS TO PASSES.

Proximity expressed from dark green (< 200 m) to red (> 2500 m), calculated for fenced mounds, unfenced mounds, total mounds, and one example of random dataset.



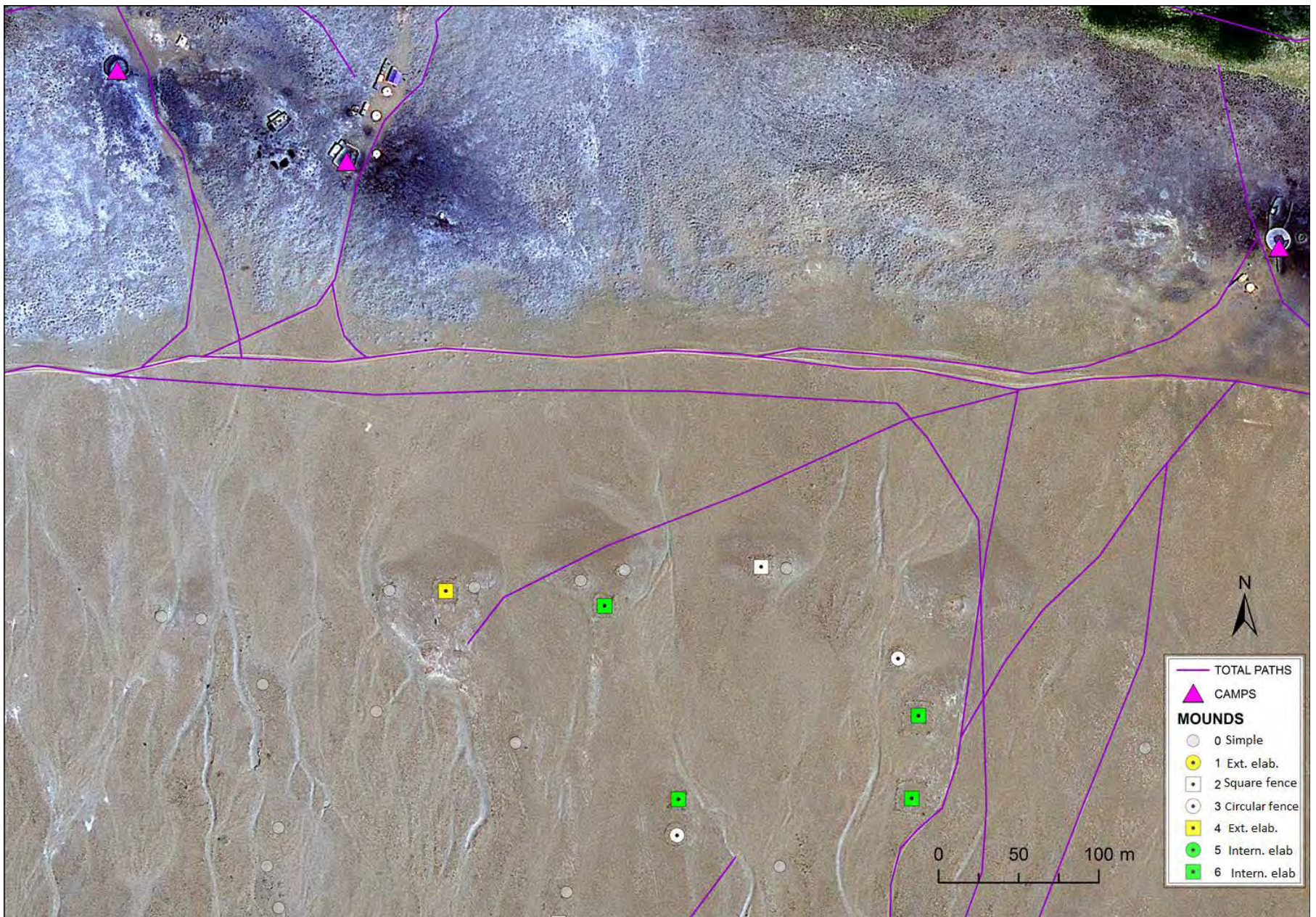
Thematic maps of the calculated distance from each mound to the closest HYDROGRAPHIC features. Proximity expressed from dark green (< 200 m) to red (> 2500 m), calculated for fenced mounds, unfenced mounds, total mounds, and one example of random dataset.





**Thematic maps of the calculated distance from each mound to the closest DIGITALISED, modern, pastoral PATHS. Proximity expressed from dark green (< 200 m) to red (> 2500 m), calculated for fenced mounds, unfenced mounds, total mounds, and one example of random dataset.**

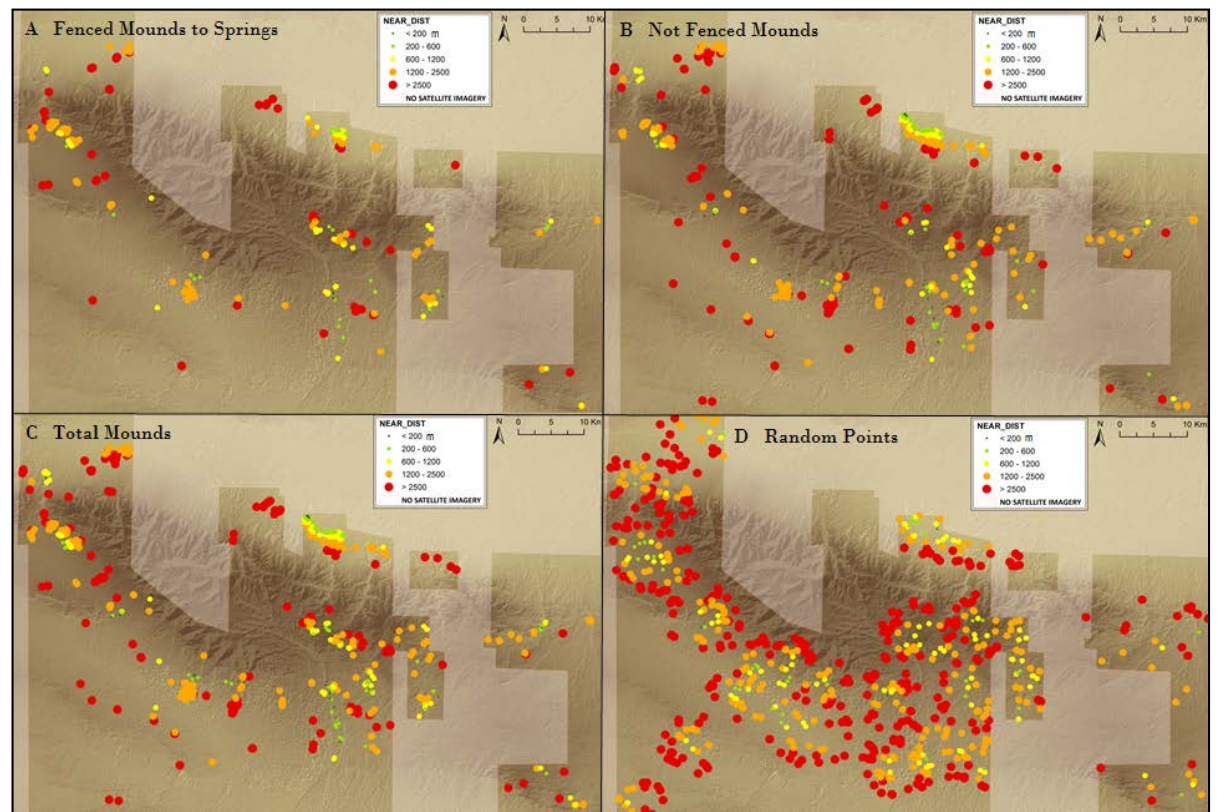




Elaboration of GeoEye satellite image of modern paths, springs and autumn campsites set on the SW shore of Orog Nuur Lake, with Bronze and Iron Age mounds represented according to the classification used by Wright (2007) and previously used in the photo interpretation of mounds in Google Earth (see legend).

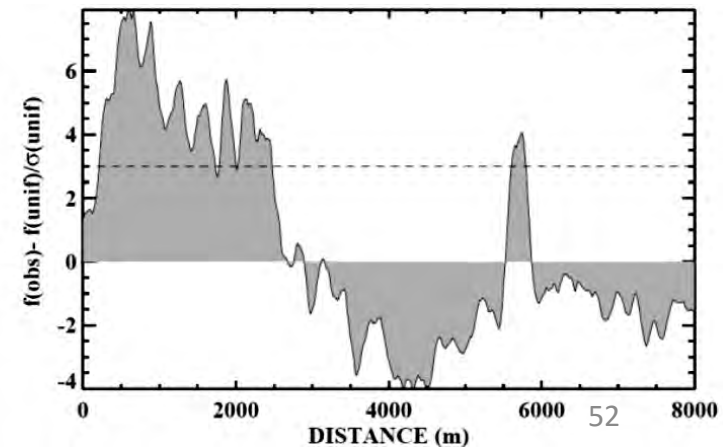
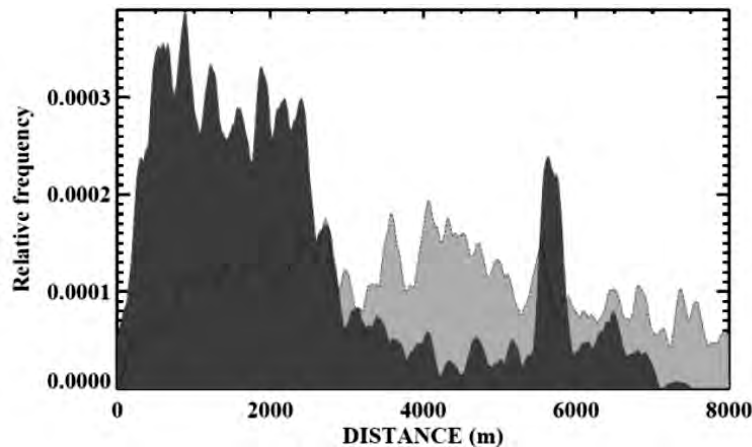


# Proximity of mounds to modern springs and wells

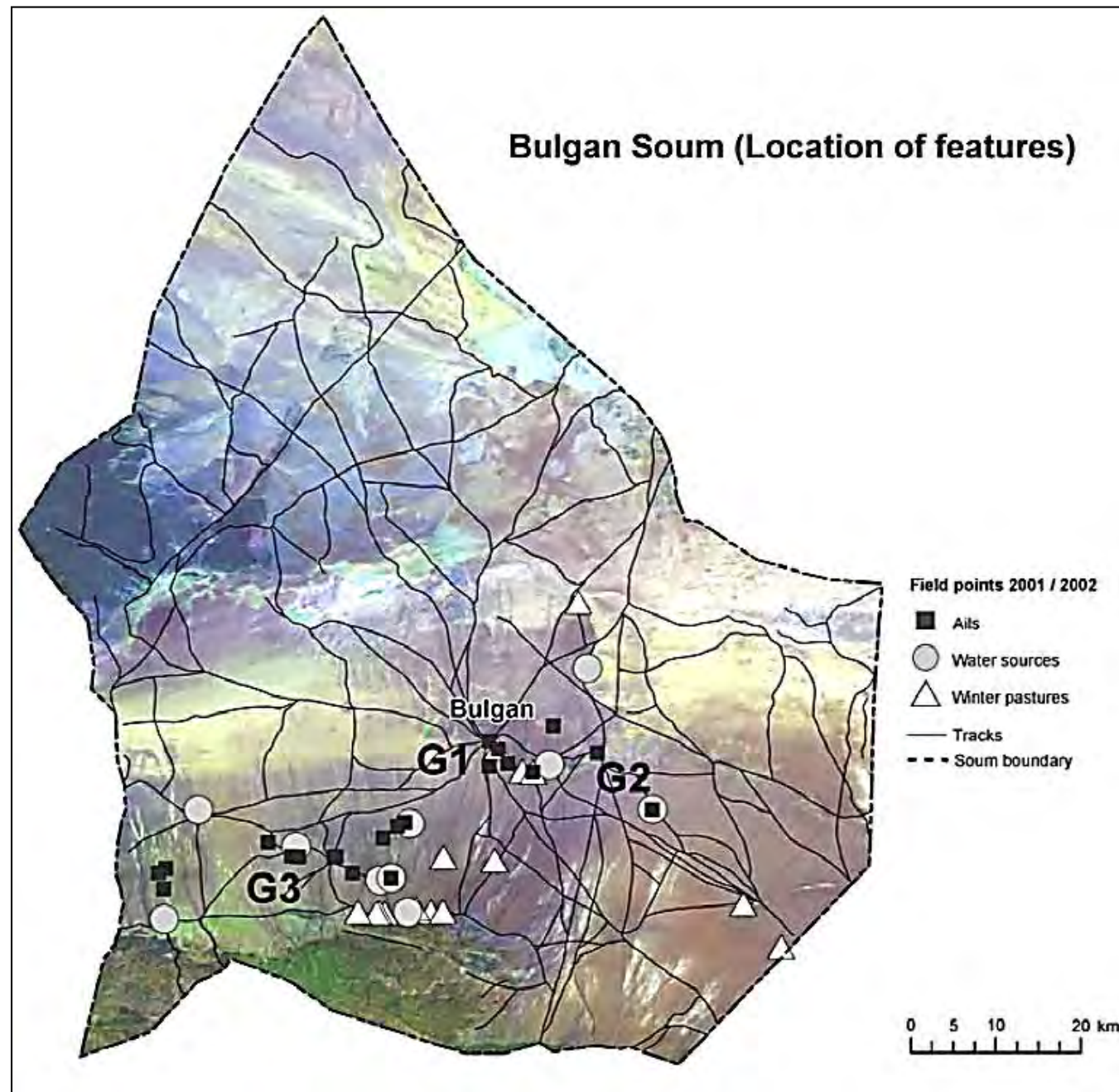


Calculation of near distance of fenced mounds (A), unfenced mounds (B), the sum of both groups, total mounds (C) and one sample of random points (D) to ACS paths to modern springs and wells.

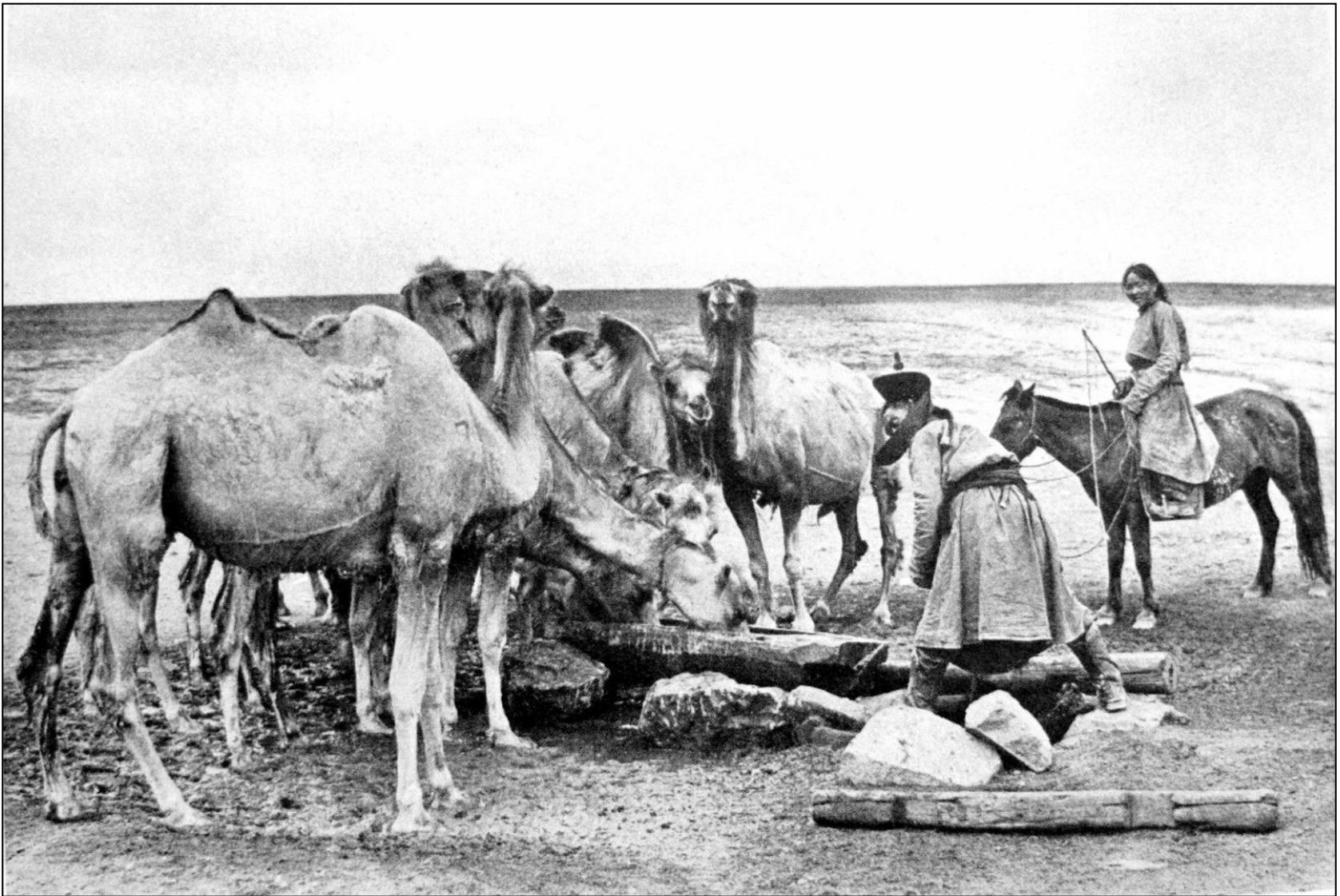
Histogram of relative frequency and normalized relative frequency of distances from mounds to modern springs, compared to one of the random datasets.



Localisation of herders' winter campsites (ails), water sources, and winter pastures in Bulgan Soum, Ömnögobi aimag, in the semi-desert environment of steppe and mountains of Southern Mongolia, 250 kilometres southeast of Ikh Bogd Uul Mountain. In Meissner & al. (2004: Fig. 5).

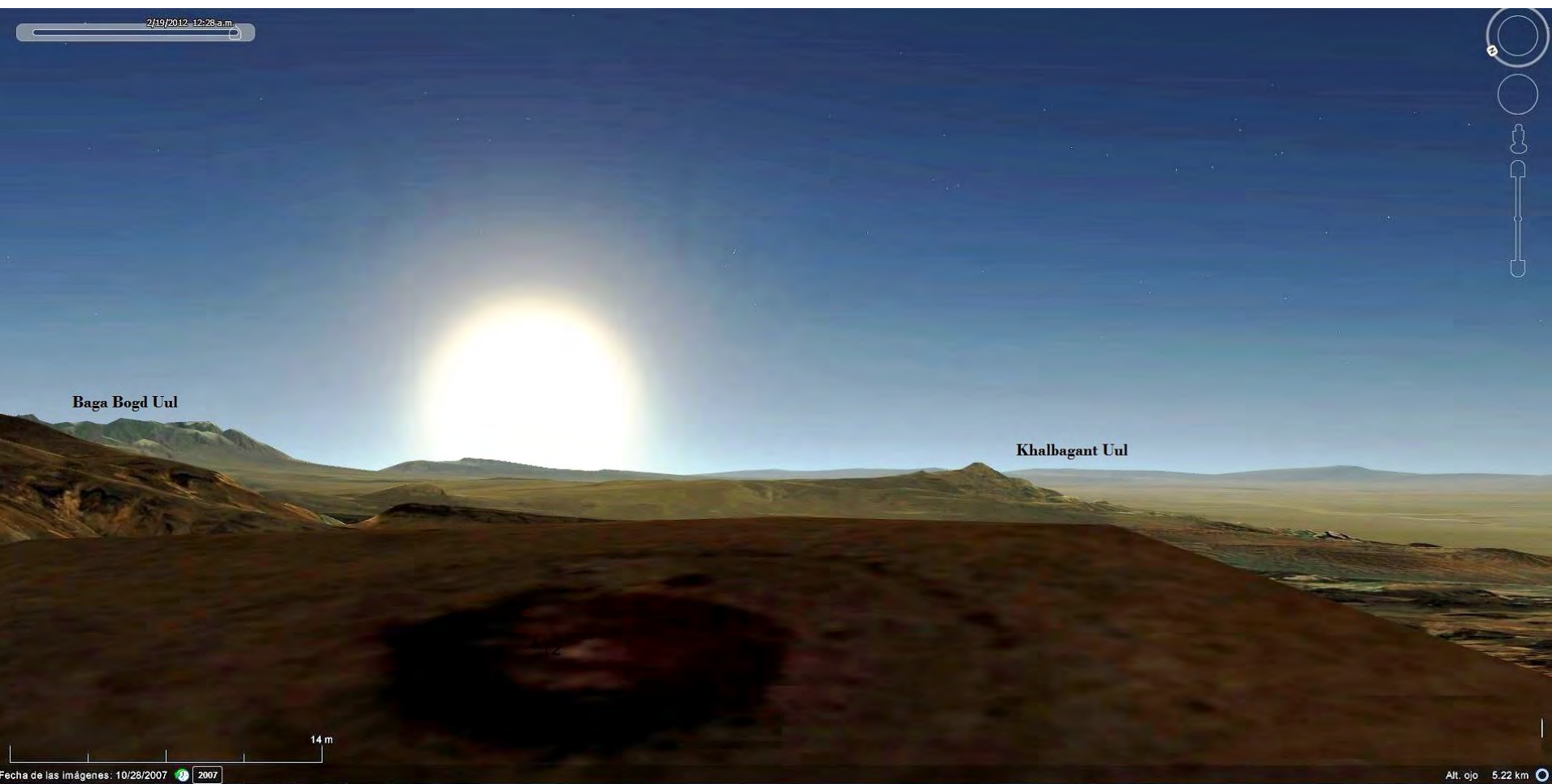






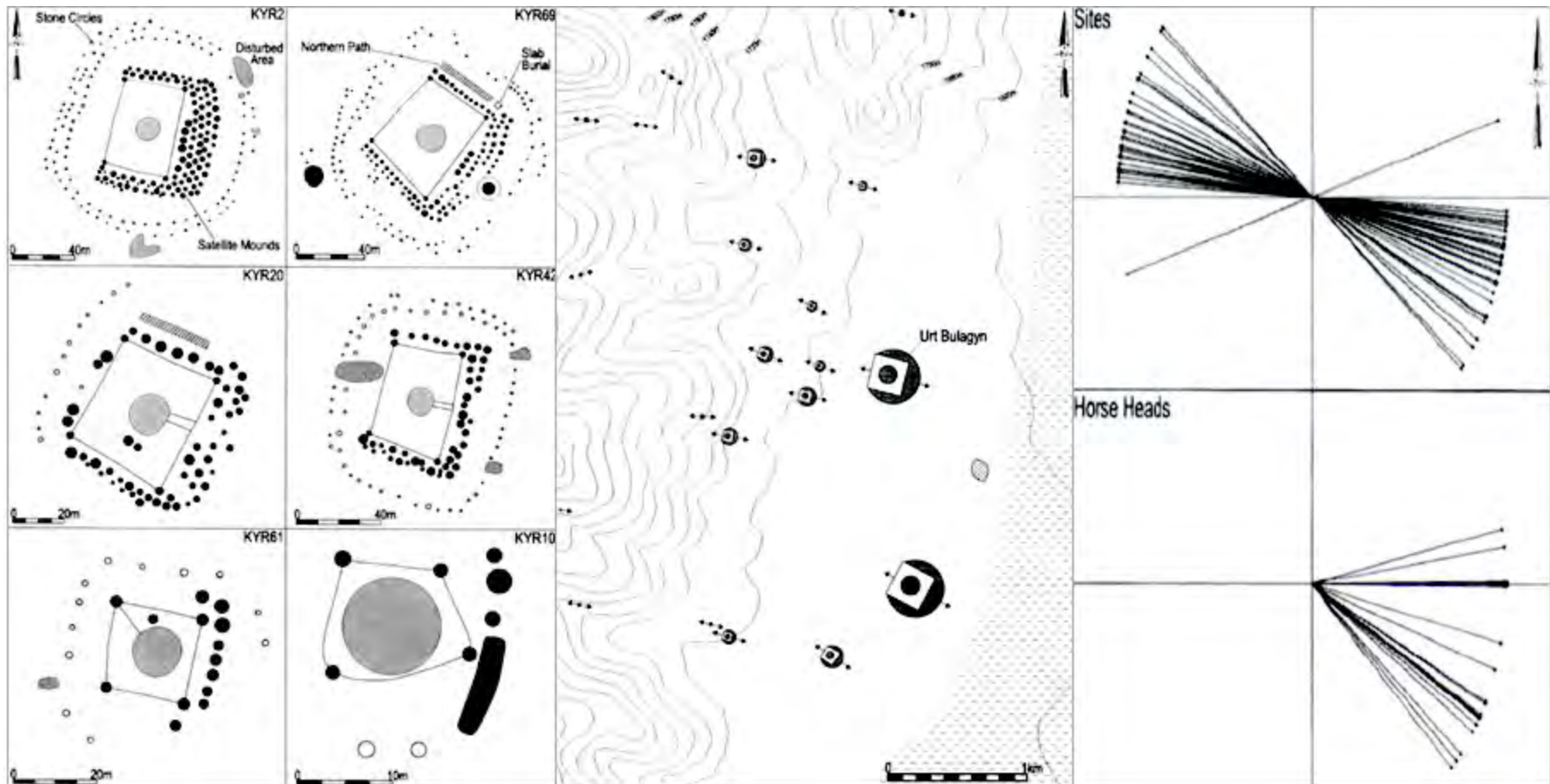
**Water, social organisation and identity: well located along a caravan trail in the area of the Orog Nuur Lake, early 20<sup>th</sup> century. In Chapman Andrews (1933: 690).**

# 11. Archaeoastronomy



3-D rendering of the view from the khirigsuur mound at the top of Puntsag Oboo Hill to the eastern horizon, reconstructing the sun rising on the first day of the Mongolian New Year, Tsagaan Sar, on 19 February 2012.

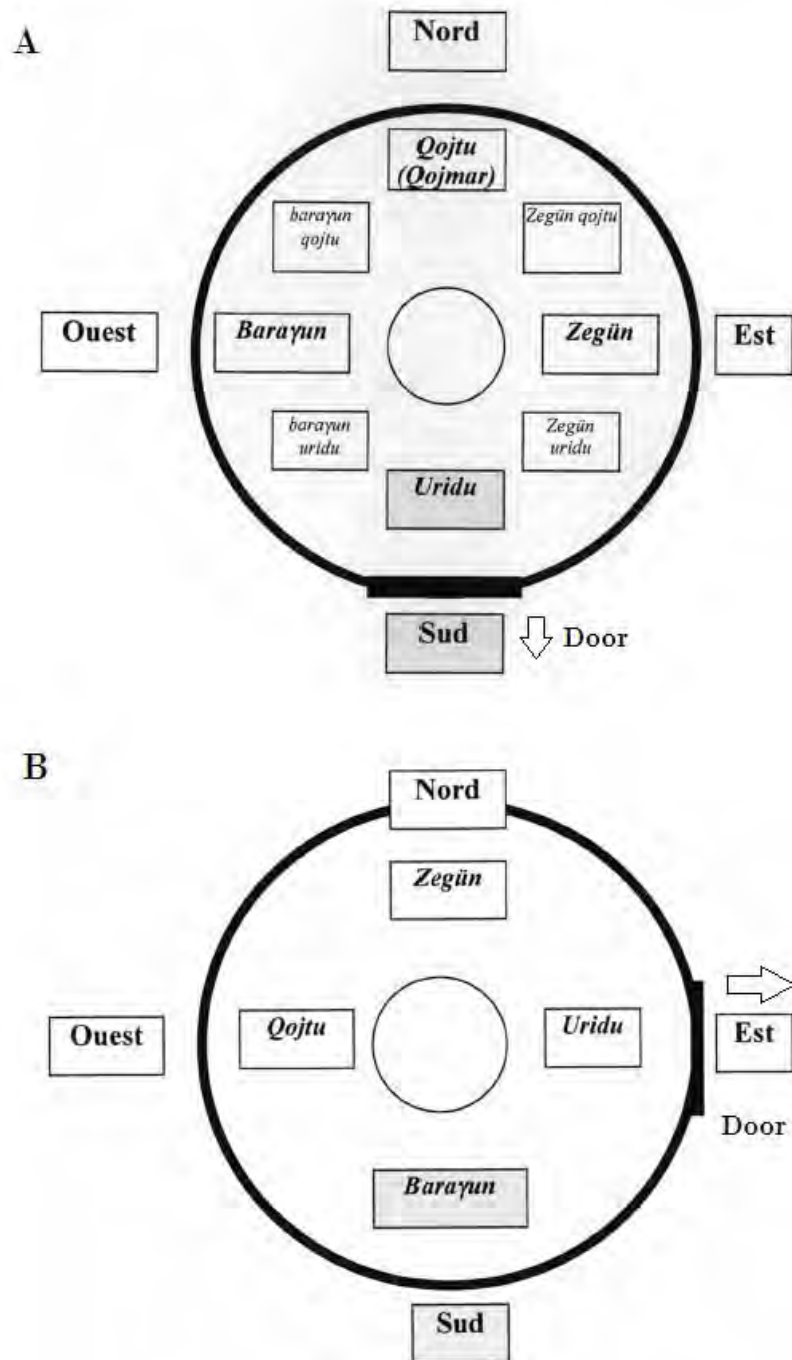




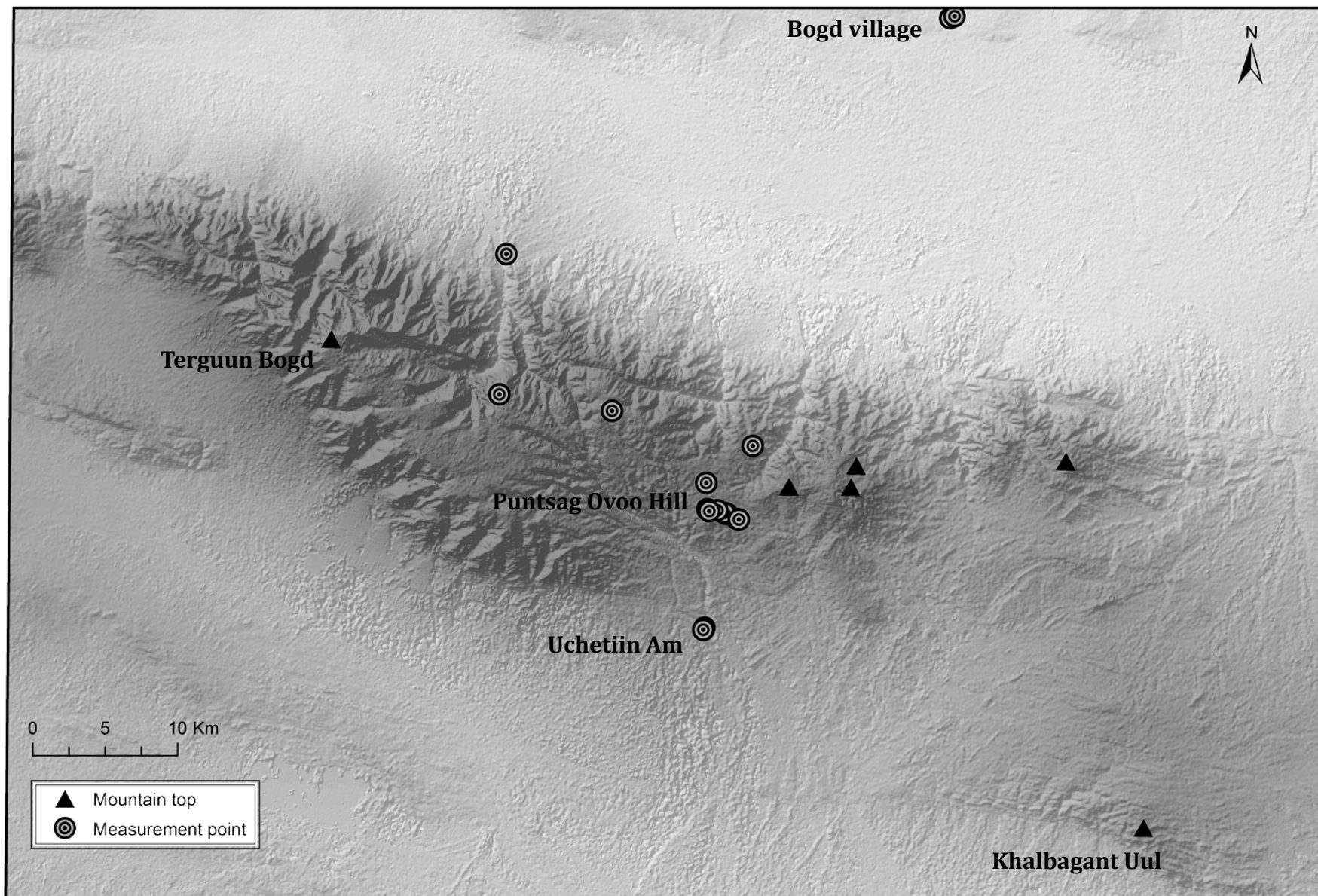
Orientation to E and SE of Mongolian khirgsuur mounds, after Allard & Erdenebaatar (2005).

## Orientation of ger felt tents

Ideal correspondence between cardinal directions and orientation of the ger tent in Mongolia, including the alternation of the door to the south (A) or to the east (B), as is the case in the Ordos region and in the research area (Modified drawing after Marois, 2006: Fig. 1 and 2).

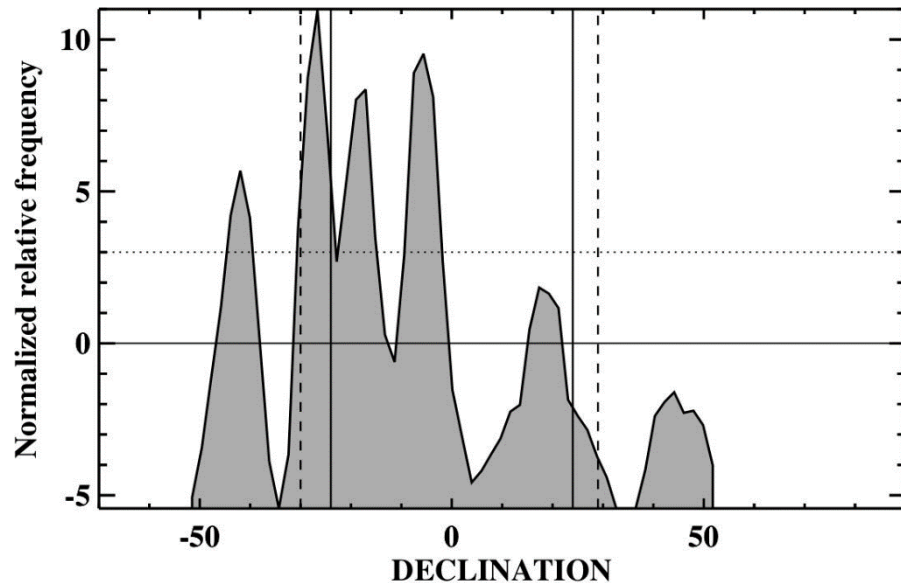




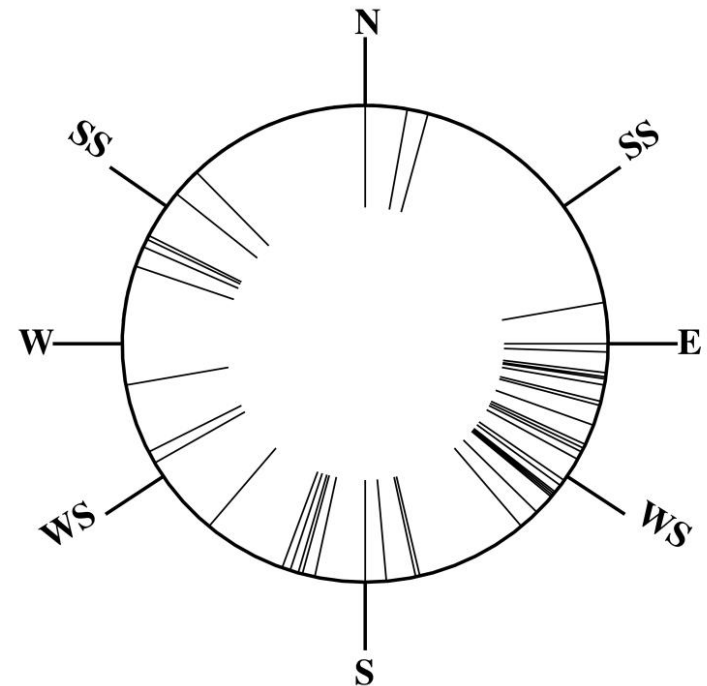


Measurement points (mounds + other ritual structures) and significant mountaintops considered in the horizon.

## Orientation of mounds and other ritual structures to the southern major lunar standstill

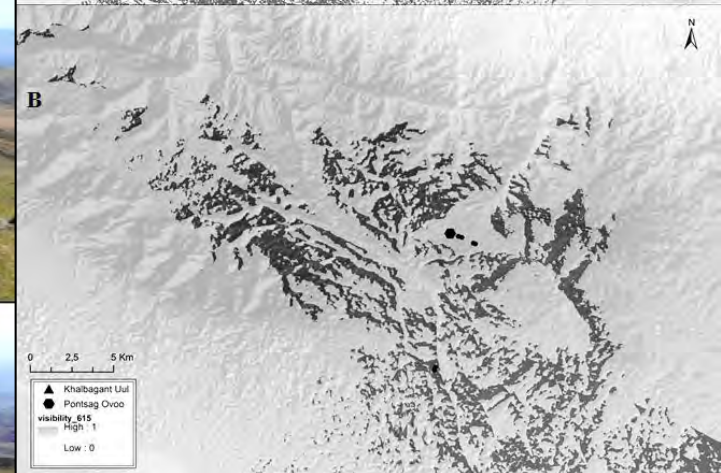
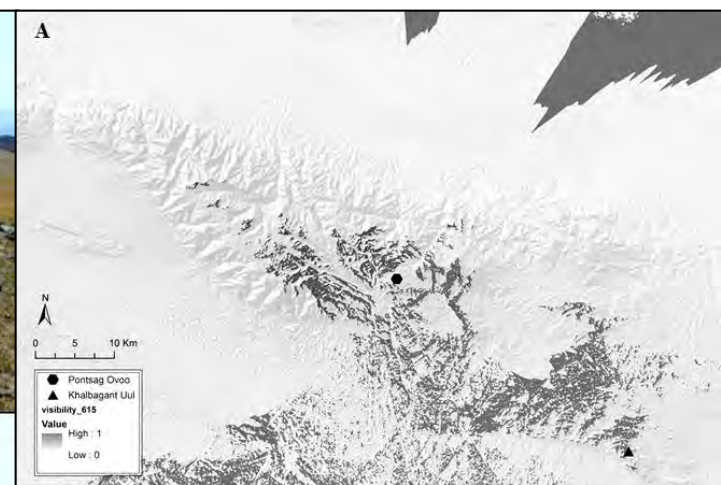


Histogram showing the normalised relative frequency for the values of declination of measurements taken from khirigsuur mounds on Ikh Bogd Uul Mountain. The vertical solid lines indicate the limits of the solar range (solstices), while the vertical dashed lines indicate the lunar extremes. Most of the declination values apparently concentrate in correspondence with the major lunar standstill, rather than the solar solstice.



Orientation diagram of the total measurements taken at the khirigsuur mounds and other sites, marked according to cardinal points and the limits of the solar range (SS summer solstice, WS winter solstice). It is possible to observe the concentration of orientations around a point south of the declination of the rising sun at the winter solstice, which corresponds to the declination of the southern major lunar standstill.





Calculation of visibility from the Puntsag Oboo mound on the top of the hill (A); detail of the calculation showing the impossibility of intervisibility of the slope mounds of Puntsag Oboo Hill from the *khirigsuur* mound on the top of the hill (B).

The silhouette of Khalbagant Uul Mountain on the distant horizon, viewed from three *khirigsuur* mounds located on the eastern slope of Puntsag Oboo Hill and considered in this archaeoastronomic analysis, August 2011.



# 12. Cultural astronomy and interpretation

## Tsagaan Sar (white month or white moon), the Mongolian New Year



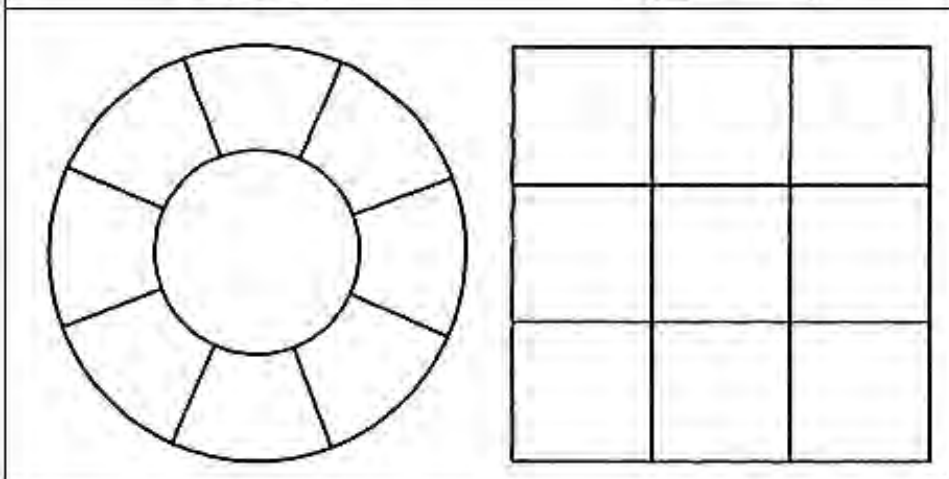
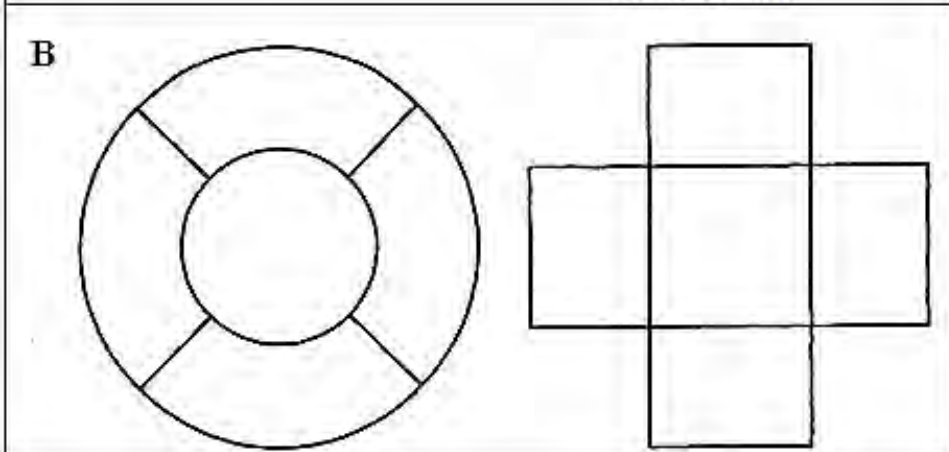
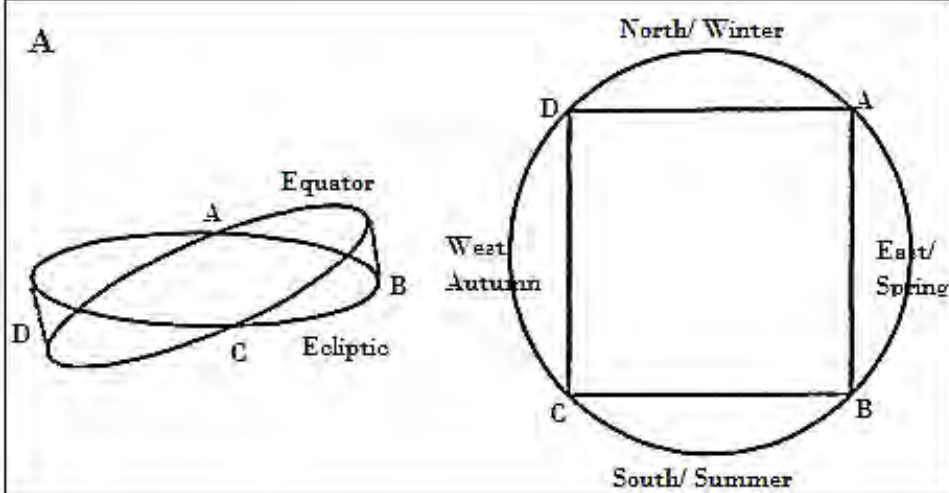
(Above) The ritualised cosmic *tsam* dance at Daschoilin Khiid, which is also traditionally performed in Buddhist monasteries for the celebration of Tsagaan Sar, in February. Ulaanbaatar, early August 2006.



Traditional celebrations for Tsagaan Sar in rural Northern Mongolia. Pyramid of white food, sweets and dairy products (left), and familiar reunion, drinking alcohol and fermented milk with the elders (above). In Ruhlmann & Gardelle (2013).







**Mounds, possible astronomical and cosmological references and possible calendric purposes.**

Modified sketches of the conception of round Heaven and square Earth, their astronomic basis and calendric implications in Han cosmology (A); the five-fold and nine-fold representation of the Heaven (circle) and the Earth (square) (B).

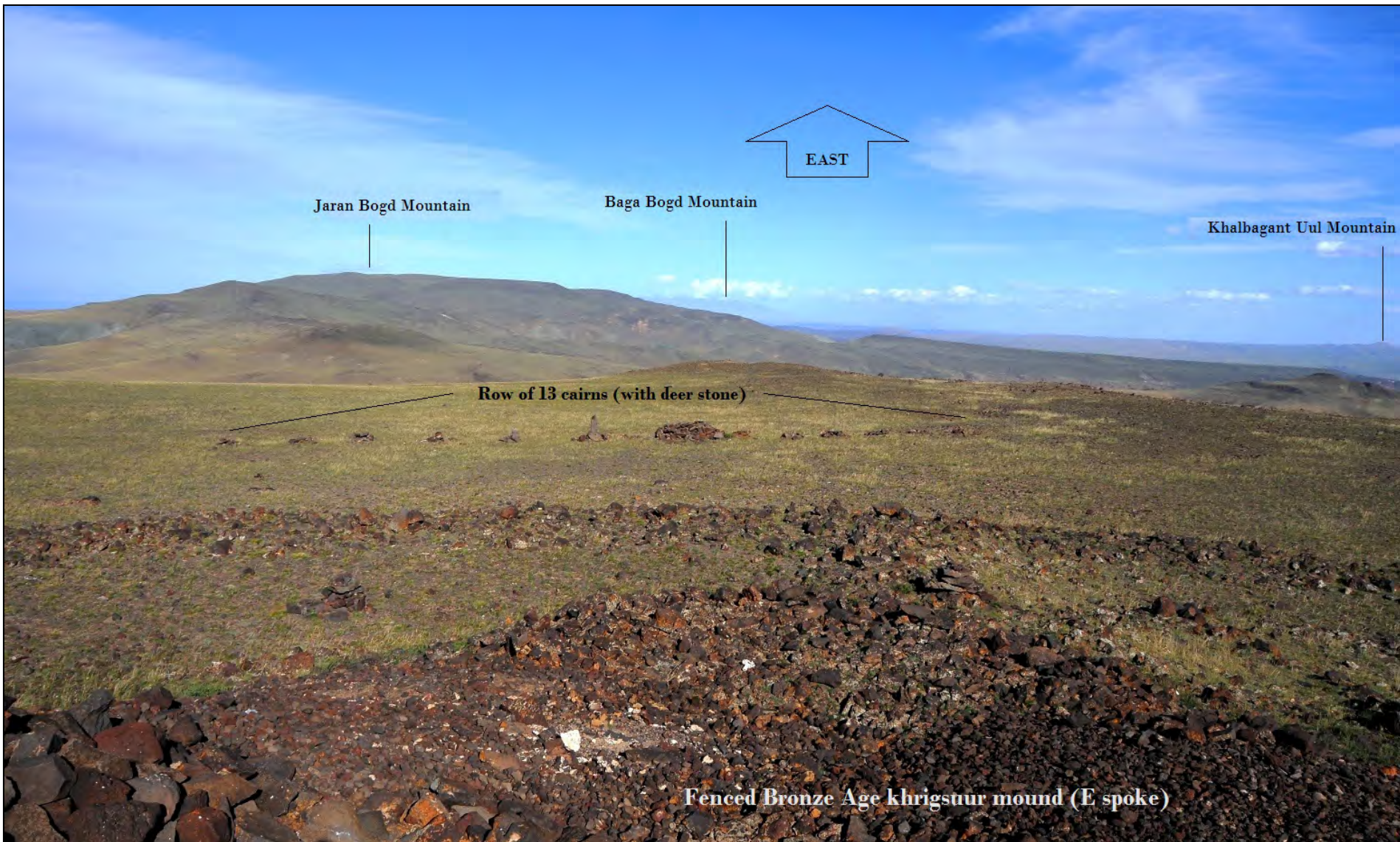
According to Huainanzi, Chinese astronomic texts from the early first millennium AD, in Major (1999: 33, 37-38, Figs. 2.1, 2.6 and 2.7).

## Puntsag Ovoo Hill



Area for wrestling competition in *naadam* ceremony documented on the plain NE of Puntsag Ovoo Hill, in correspondence of a mountain pass, in october 2009.

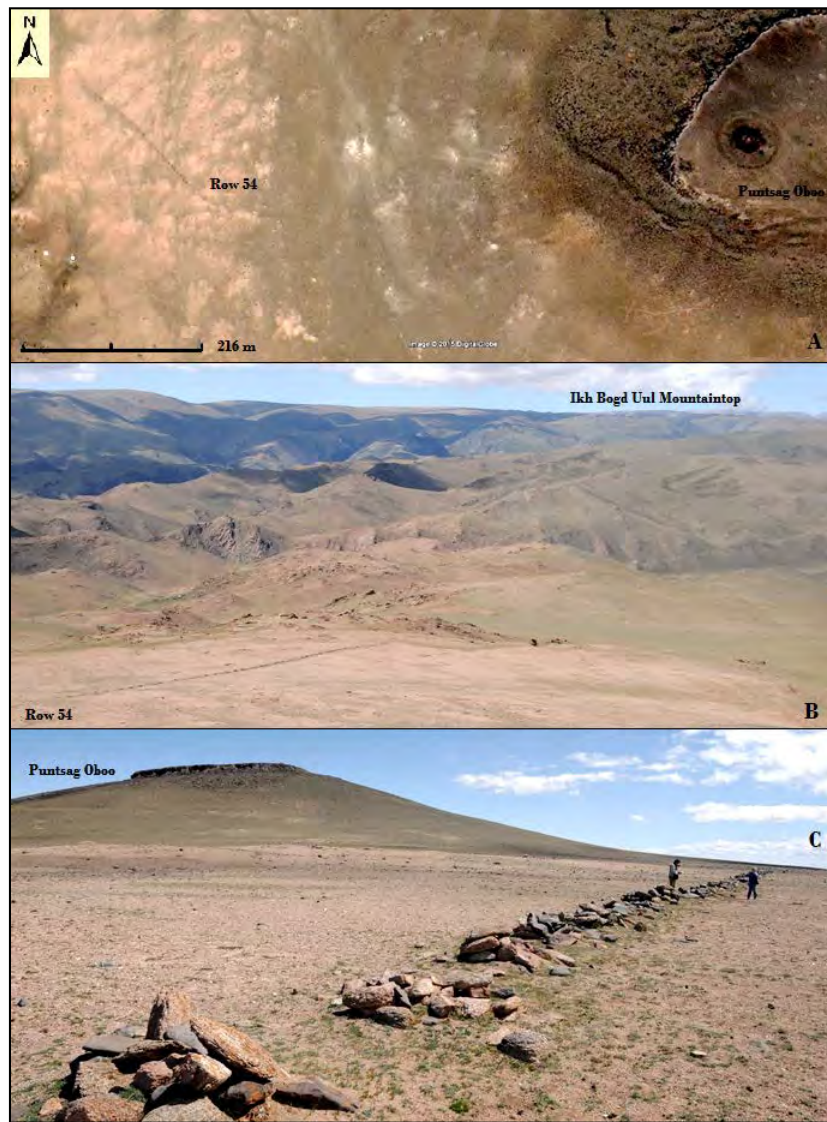




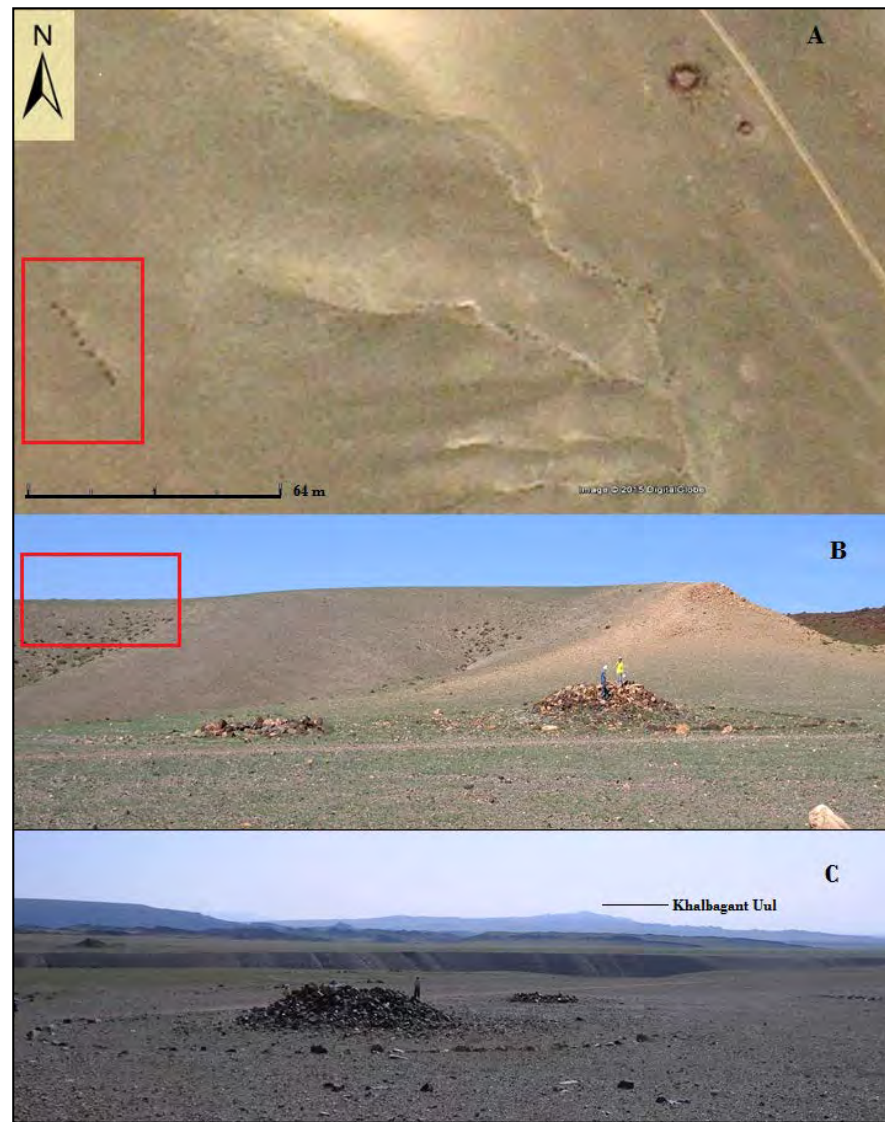
View to the east-facing, N-S oriented row of 13 cairns with deer stones from the top of the Bronze Age mound on the top of Puntsag Ovoo Hill, August 2011.



## Persistent cosmologies: the row of 54 and 9 cairns



Path of the spirits'. NW-SE oriented row of 54 cairns on the western side of Puntsag Oboo Hill in GE satellite image (A); a view from the hill of Puntsag Oboo towards the west (B); and in situ picture towards SE (C).



NW-SE oriented row of 9 cairns on the hill next to the Late Prehistoric funerary cluster of Uchetiin Am valley, in the satellite image (A); viewed from the east (B); and a view of the site towards the SE and towards the 'archaeoastronomic' mountain of Khalbagant Uul (C).





Persistent pastoral and sacred geographies in the area of Puntsag Oboo Hill: *khirigsuur* mounds, row of 54 cairns, rock art sites, present summer campsites, road, and the wrestling area of *naadam* in a modified Google Earth satellite image.

## 13. Conclusions and final remarks

In this work, I have explored Mongolian and Central Asian cosmologies in the archaeological record, in written sources and in local folklore, in order to outline the symbolic values that were projected onto Ikh Bogd Uul Mountain in the form of diverse sacred geographies, which took shape as peculiar stone monuments over centuries and millennia. When I have compared the periodic and reiterative interactions with Ikh Bogd Uul Mountain by the present communities with the pastoral, ritual, and funerary practices of the ancient inhabitants during the Bronze and Early Iron Age, the persistence of spatial choices has emerged as an intrinsic and structural characteristic of the local landscape.



## 13. Conclusions and final remarks



View of the flat summit of Ikh Bogd Uul, Terguun Bogd, from Tsonji Ovoo, late August 2011





Autumn shift of local herders, bringing their **dismounted** felt tent , in an inner valley of the Baga Bogd Uul Mountain, August 2006.



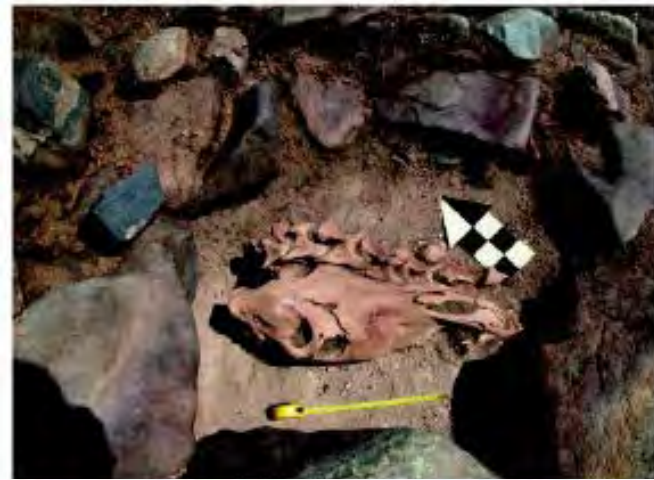


Circumambulation of Gegonii Owoo, on the Ikh Bogd Uul Mountain, August 2011.





(Above) Horse sacrifices at the stone cairns on the summit of the sacred hill of Uhér, in Buryatia, celebrated before *naadam*, recorded and photographed by Curtin (1909: 47-55) in the early 20<sup>th</sup> century.



Remains of horse sacrifice in the excavation of a late Bronze Age khirgsuur mound-deer stone complex in Northern Mongolia, by the Smithsonian Institute, in Fitzhugh (2009: 189).





**View to the east from Tsagaan Övdög, with Orog Nuur and the Valley of Lakes in the background.  
Prehistoric mounds and present road, in a location also known as a traditional Chinese post station on an ancient caravan route.**





**The End**

**BAIRLAA! Thank you!**