

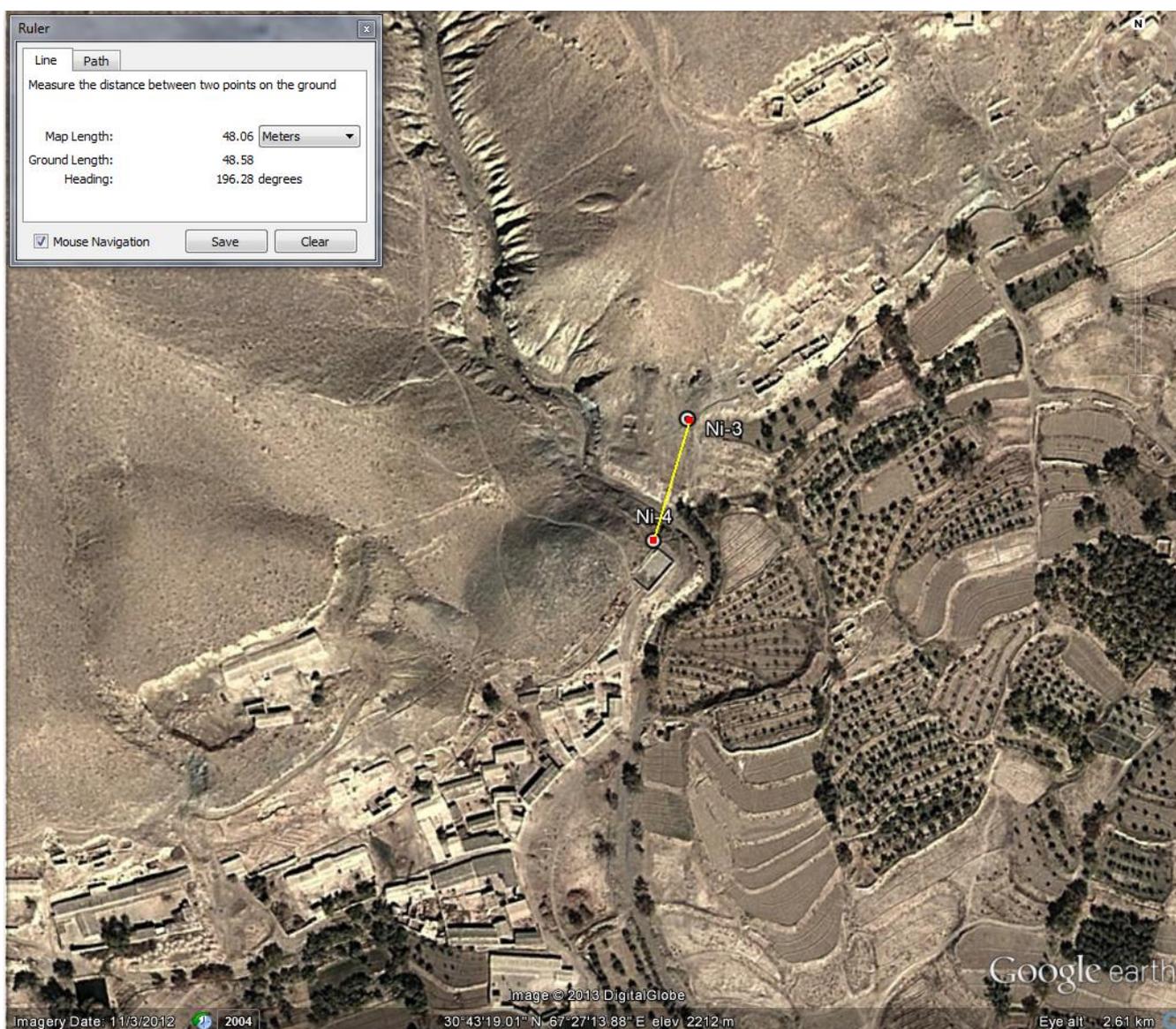
## Online Appendix 1

### Nisai Intrusions, Ziaba Section Khanozai area, northwestern Pakistan: sample locations and field notes

**Sample no. Ni-03:** Igneous intrusion in Nisai Formation near Churmian village. N  $30^{\circ} 43' 20.3''$  E  $067^{\circ} 27' 15. 2''$ . Altitude; 2225 metres.

**Sample no. Ni-04:** Igneous intrusion about 100 metres west of Ni-03 in Nisai Formation near Churmian village. N  $30^{\circ} 43' 18.79''$  E  $067^{\circ} 27' 14. 17''$ .

- **Samples Ni-3 & Ni-4 are 60m apart in a southerly direction.**
- **Located either side of a road/dried river bed.**



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**Sample no. Ni-05:** Igneous intrusion in Nisai Formation near Zaiba village. N 30° 42' 34.49" E 067° 25' 48. 20".

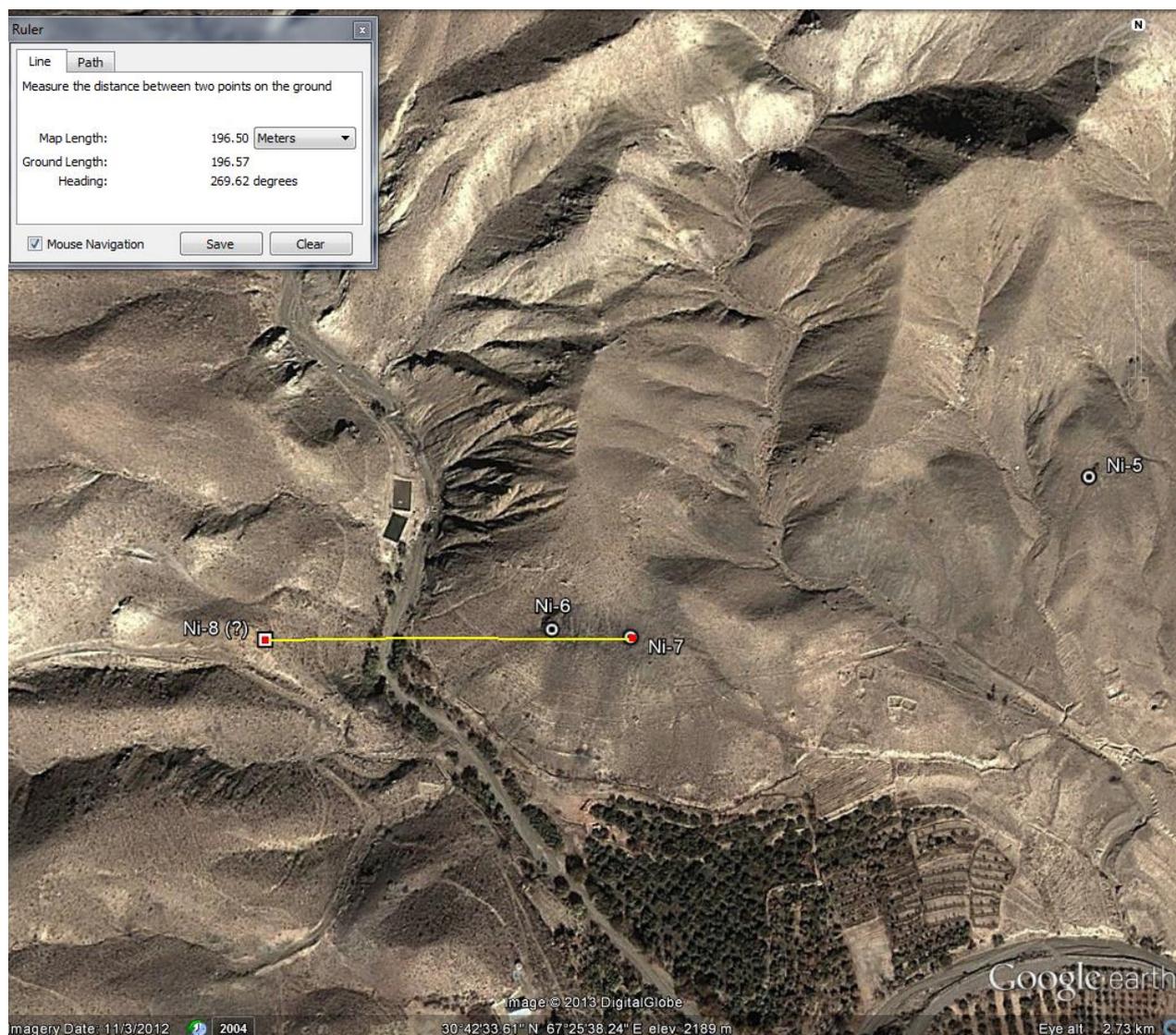
**Sample no. Ni-06:** Igneous intrusion in Nisai Formation near Zaiba village. N 30° 42' 31.83" E 067° 25' 37. 42".

**Sample no. Ni-07:** Igneous intrusion in Nisai Formation within the Zaiba gorge near Zaiba village. N 30° 42' 31.7" E 067° 25' 39. 0".

- **Samples Ni-6 & Ni-7 are found in very close proximity (40m apart) on the sample hillside.**
- **Zaiba village is directly to the south of this location and the Zaiba gorge to directly to the west (70m downslope SW of Ni-6).**

**Sample no. Ni-08:** Igneous intrusion about 200 metres west of Ni-07 in the Nisai Formation, Zaiba Gorge near Zaiba village.

- **NO COORDINATES**
- **Approximately 200m of Ni-7, therefore has been approximated on map (square marker). Located on opposite side of the 'Zaiba gorge' from Ni6 & 7.**



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**Sample no. Ni-09:** Igneous intrusion in Nisai Formation southwest of Zaiba village. N  $30^{\circ} 41' 38.2''$  E  $067^{\circ} 24' 23.8''$ . Altitude; 2125 metres.

**Sample no. Ni-10:** Igneous intrusion nearby the sample no. Ni-08 in Nisai Formation southwest of Zaiba village. N  $30^{\circ} 41' 38.2''$  E  $067^{\circ} 24' 23.8''$ . Altitude; 2125 metres.

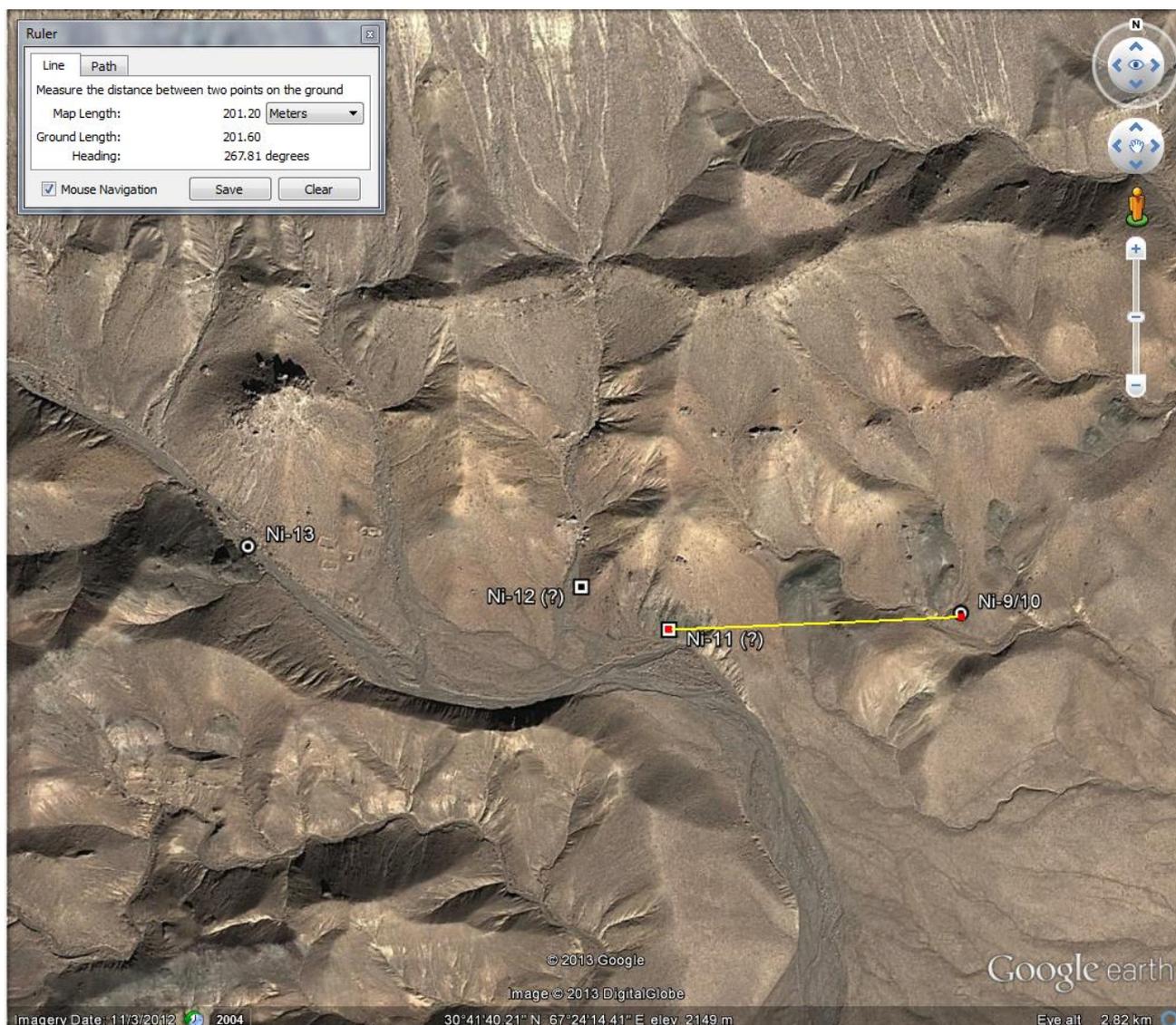
**Sample no. Ni-11:** Igneous intrusion about 200 metres west of Ni-09 & Ni-10 in Nisai Formation, in the area between Zaiba and Murgha Zakaryazai village.

**Sample no. Ni-12:** Igneous intrusion about 70 metres northwest of Ni-11 in Nisai Formation, in the area between Zaiba and Murgha Zakaryazai village.

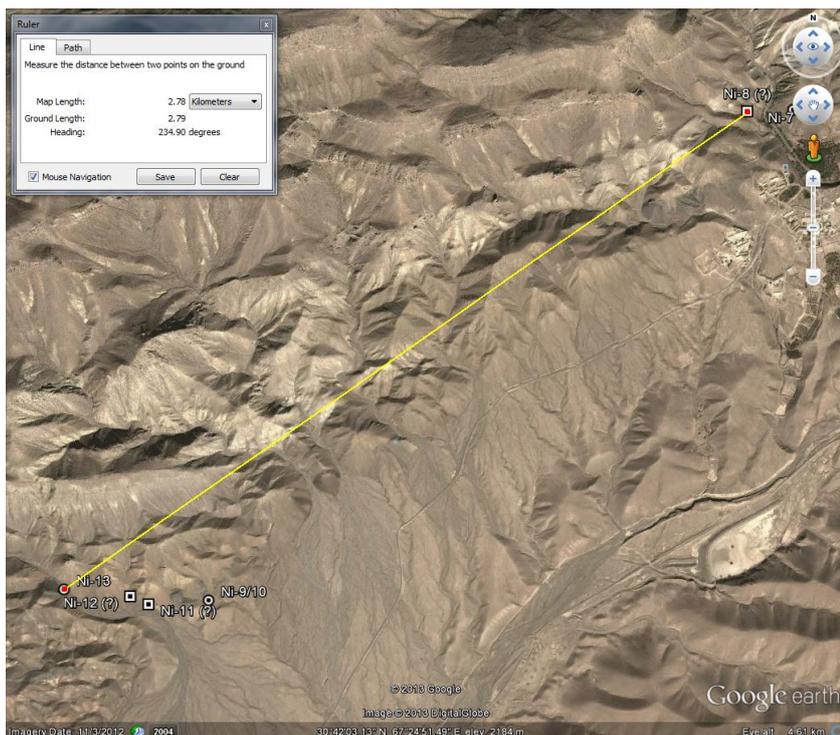
- Villages are not located on Google earth so cannot use for exact reference.

**Sample no. Ni-13:** Igneous intrusion about 300 metres west of Ni-07 & Ni-08 in Nisai Formation, in the area between Zaiba and Murgha Zakaryazai village. N  $30^{\circ} 41' 39.7''$  E  $067^{\circ} 24' 05.9''$ . Altitude; 2144 metres.

- Located within a dried river bed... prominent feature directly to the west of these coordinates indicates the igneous intrusion.



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**Sample no. Ni-14:** Igneous intrusion in lower shaley part of Nisai Formation up stream of the Murgha Zakaryazai high school. N 30° 41' 21.11" E 067° 23' 55.07".

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**Sample no. Ni-15:** Fine-grained dolerite? About 20 m north of Ni-14 in lower shaley part of Nisai Formation up stream of the Murgha Zakaryazai high school.

**Sample no. Ni-16:** Course-grained dolerite? About 100 m northwest of Ni-15 in lower shaley part of Nisai Formation upstream the Murgha Zakaryazai high school.

**Sample no. Ni-17:** Dolerite? About 120 m west of Ni-16 in lower shaley part of Nisai Formation up stream of the Murgha Zakaryazai high school.

- **Ni-15 is directly up-valley from Ni-14**
- **Ni-16 is on a separate hillside.**
- **Ni-17 sampled within a dried river bed**

**Sample no. Ni-18:** Fine-grained dolerite? About 30 m west of Ni-17 in lower shaley part of Nisai Formation up stream of the Murgha Zakaryazai high school. N 30° 41' 31.43" E 067° 23' 45.88".

- **Located at the top of the water-shed for the dried river.**

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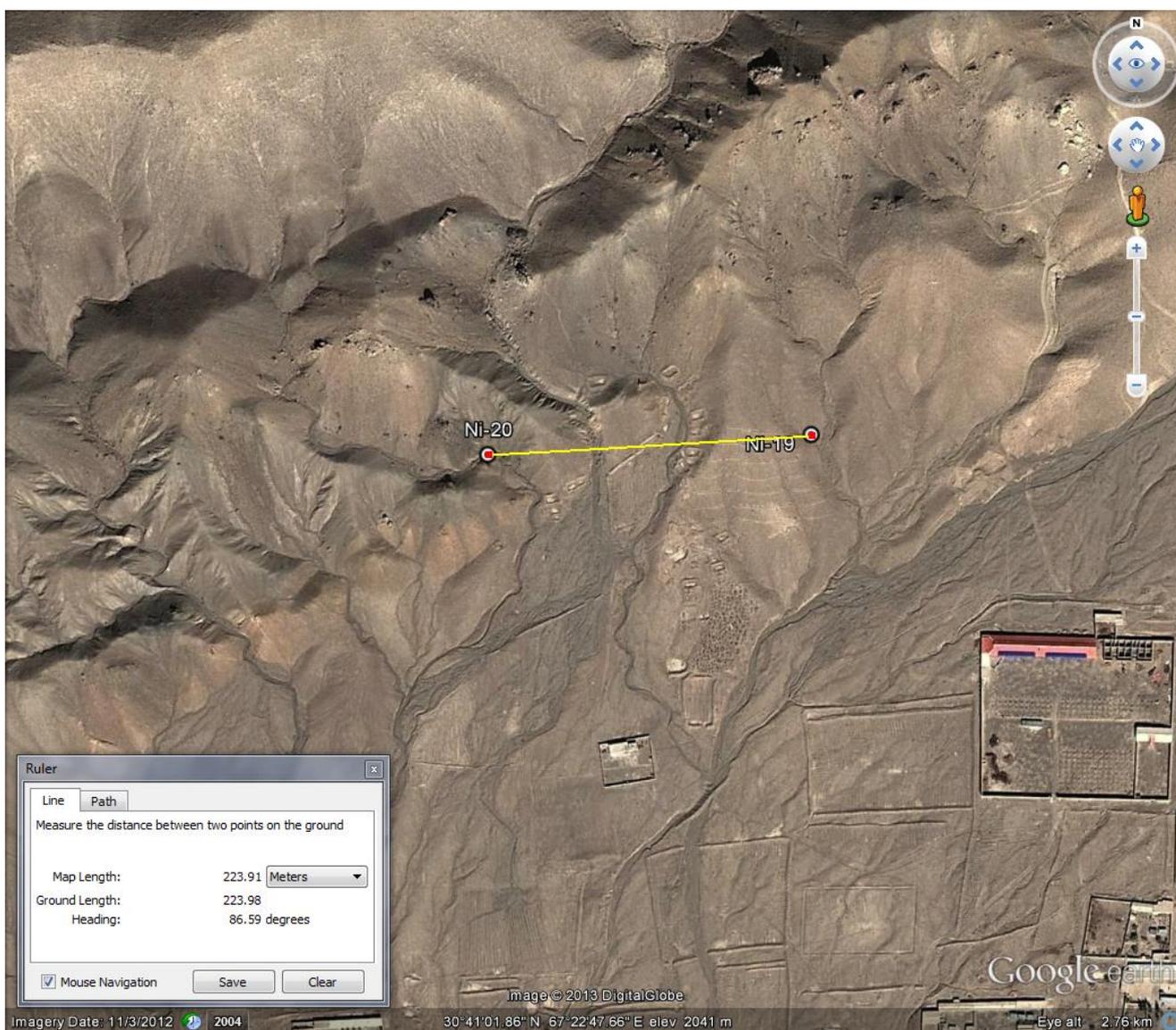


**Sample no. Ni-19:** Igneous intrusion in Nisai Formation on the top of Murgha Zakaryazai village. N 30° 41' 03.85" E 067° 22' 53. 3". Altitude; 2011 metres.

**Sample no. Ni-20:** Igneous intrusion in Nisai Formation on the top of Murgha Zakaryazai village. N 30° 41' 03.4" E 067° 22' 44.9. Altitude; 2055 metres.

- **Both located in a similar location, 220m apart on separate hillsides.**

## Online Appendix 1



**Sample no. Ni-21:** Igneous intrusion in Nisai Formation near Nareen village. N 30° 40' 41.1" E 067° 21' 36.2. Altitude; 2052 metres.

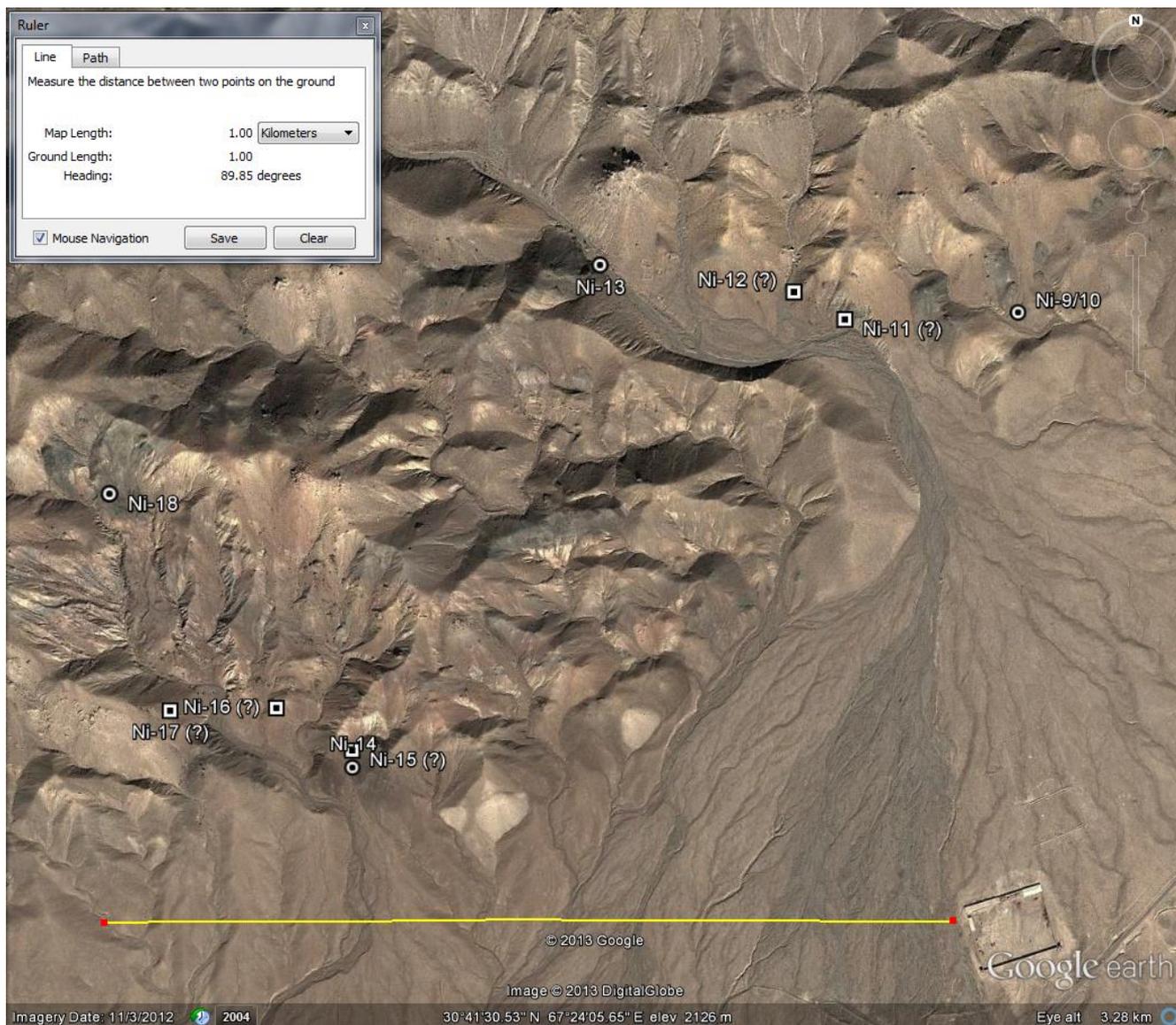
- **Ni-21 is located on the summit of a prominent feature in the landscape.**

# Online Appendix 1





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