

Glacier lake inventory of the northern Tien Shan

-Kyrgyz, Kungoy, and Teskey Ala-Too Ranges-



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Photo: Glacier lakes in Ukok Valley on 21 August 2014 (by C. Narama)

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Special words in this report

GLOF: Glacier lake outburst flood (GLOF) is a type of outburst flood that occurs when the moraine dam containing a glacier lake breaks. The break occurs due to erosion, a buildup of water pressure, an avalanche of rock or heavy snow, an earthquake, and open of ice tunnel inside of ice-cored moraine.

Moraine: The moraine consists of debris (rock and sand) transported and deposited at the margins of advancing glaciers. The spatial distribution of old moraines indicates the past positions of glacier fronts.

Debris: Rock and sand materials in different sizes, produced by glacier erosion, rock fall, and landslide etc...

Dead ice: Dead-ice occurs when a glacier ceases to move and melts in glacier terminal part. After the ice has melted, it leaves ice-bodies covered by debris as dead ice.

Supra-dead-ice lake (SDL): Supra-dead-ice lake is small lake which develops on the debris-covered dead-ice zone in front of glacier.

Supra-glacial lake: Supra-glacial lake is small lake which develops on debris-covered glacier.

1. Introduction

Mountain glaciers in the eastern Himalayas (Eastern Nepal and Bhutan) have recently shrunk in response to climate change (UNEP, 2007; Bolch et al., 2008; Kääb et al., 2012). Very large glacier lakes ($>0.1 \text{ km}^2$) are particularly found in the eastern Himalayas compared to other parts of the mountain system. These glacier lakes began expanding between 1950 and 1970 (Ageta et al., 2000), and since then, glacier lake outburst floods (GLOFs) have occurred once or twice per decade in this region (Richardson and Reynolds, 2000; Ives et al., 2010). After GLOF in October 1994 from Lugge-Tso (1.16 km^2) in the Lunana region of the northern Bhutan (Watanabe and Rothacher, 1996; Ageta et al., 2000), GLOF which caused victims have not occurred in the eastern Himalayas. ICIMOD (International Centre for Integrated Mountain Development) reported 24 potentially dangerous glacier lakes in the Bhutan Himalayas (Mool et al., 2001; Ives et al., 2010), and the Japanese JICA/JST projects made a glacier lake inventory for the Bhutan Himalayas using high-resolution ALOS satellite imagery taken in 2006-2010 (Ukita et al., 2012).

International efforts commonly focus on the larger glacier lakes, but small-scale GLOFs are also known to have caused considerable damage, for instance in mountainous regions of Central Asia, in the Peruvian Andes or in the European Alps. In the Tien Shan mountains of Central Asia, glacier lakes with areal extents of $0.01\text{--}0.05 \text{ km}^2$ often produced GLOFs between 1950 and 1970, leaving many victims in their downstream areas (Kubrushko and Staviskiy, 1978; Kubrushko and Shatrabin, 1982; Narama et al., 2009). In the Gissar-Alay region, a GLOF from a small glacier lake ($50,000 \text{ m}^3$) in July 1998 caused more than 100 victims in the downstream village of Shahimardan (UNEP, 2007). Similar, a small glacier lake in the Pamir, Tajikistan, killed many people and caused heavy damage in 2002 (Mergili and Schneider, 2011). The distances between inhabited areas and glacier lakes are very small in this region, and people living near the river commonly experience serious damage caused by debris flows (Narama et al., 2010).

In the northern Tien Shan, small glacier lakes at glacier fronts are numerous. These glacier lakes have produced frequent GLOFs since 1970-80s, causing serious damages and ongoing concern among residents of nearby mountain villages. To understand the current state of glacier lakes (the distribution, development, and flooding histories) in the northern Tien Shan, we made glacier lake inventory in the Kyrgyz Ala-Too Range, Kungoy Ala-Too Range, and Teskey Ala-Too Range using Landsat 8/OLI (Operational Land Imager) satellite images taken in 2014.

2. Study area

The Tien Shan Mountains are 2500 km long and 250–350 km wide, and they comprise many mountain ranges running east–west from Uzbekistan to northern China. The study area are the Kyrgyz Ala-Too Range, the southern part of the Kungoy Ala-Too Range, and the northern part of the

Teskey Ala-Too Range, in the northern part of Tien Shan (Fig. 1). The Kyrgyz Ala-Too Range of the study area (north part of Kyrgyzstan) is a branch of the northern Tien Shan running from Talas to the Issyk-Kul; it is 450 km long, 40 km wide, and 3000–4500 m above sea level (a.s.l.) (Fig. 1). The maximum elevation of the range is 4855 m at the peak of the Alamedin watershed located south of Bishkek (population: 1 million). Cities with large urban populations such as Bishkek have developed along the alluvial fan of the foothills of the range. Small alpine glaciers are distributed through the ranges. In the central part of the Kyrgyz Ala-Too Range, glacial coverage shrank by 13% during 1985–2000 (Aizen et al., 2006). The Kungoy Ala-Too Range (north shoreline) and Teskey Ala-Too Range (south shoreline) are located around the Issyk-Kul Lake. The Teskey Ala-Too Range, with elevations up to about 4500–5000 m a.s.l. Glacier termini in the Teskey Ala-Too Range are at elevations of 3500–3800 m.

The annual precipitation in outer ranges of the Tien Shan is higher than that in the inland ranges, because water vapor carried by the westerlies is blocked by the outer mountain ranges. Seasonal precipitation in these ranges is higher in spring to early summer, with maximum precipitation in June, and is influenced by the interaction between the westerlies and the Siberian High. In this region, annual precipitation is known to vary from the mountains to lowland areas, where high population and irrigation agriculture occur. At the Ala-Archa meteorological station (2500 m a.s.l.), the annual precipitation is 855 mm, and annual average temperature is -0.8°C ; at the Bishkek meteorological station (750 m a.s.l.; Fig. 2), annual precipitation is 467 mm, and annual average temperature is 10.5°C . In the western part of the Tien Shan such as in the Talas and Pskem regions, which is the dry season during summer, residents use the water supplied from the mountain for domestic water and irrigation agriculture.

3. Methods

The present-day (2014) distribution of glacier lakes in the the Kyrgyz, Kungoy, and Teskey Ala-Too Ranges was determined using images taken between using Landsat8/OLI images acquired from June to September 2014. We re-made new glacier lake inventory, based on second version of glacier lake inventory using aboard the Advanced Land Observing Satellite (ALOS) data taken in 2006-2010. Glacier lakes $>0.001\text{ km}^2$ at glacier fronts were manually digitized using ArcGIS and archived as shapefiles in polygon formats. Glacier lakes were recorded as bodies of water lying on depression in the ground between the mother glacier and recent terminal moraine, including the debris-covered dead-ice zone. Supra-glacial lakes ($>0.001\text{ km}^2$) on debris-covered glaciers were also included in the glacier lake inventory. The parameters of the inventory primarily followed the convention of the International Center for Integrated Mountain Development (ICIMOD) and glacier lake inventory in Bhutan (Tadono et al., 2012), including map ID, referenced satellite data and date, coordinates of the latitude and longitude of the lake center, and the area and elevation of the lake, along with auxiliary information such as type of lake (e.g., moraine-dammed lake, ice-dammed lake,

and supra-glacial lake; SGL). Glacier lakes (supra-dead-ice lake: SDL) which had developed on the debris-covered dead-ice zone were referred to as moraine-dammed lakes. Each lake was given an ID based on the name of the mountain region and the latitude and longitude at the center of the lake.

4. Distribution of glacier lakes in the northern Tien Shan

Figure 1 shows the distribution and area (circle size) of glacial lakes in the Kyrgyz, Kungoy and Teskey Ala-Too Ranges in 2014. We confirmed 198 glacial lakes ($>0.001 \text{ km}^2$) in the Kyrgyz Ala-Too Range, 38 glacial lakes in the southern part of the Kungoy Ala-Too Range, 160 glacial lakes in northern part of the Teskey Ala-Too Range (Table 1). Glacial lakes less than 0.01 km^2 comprise 80% of these in the Kyrgyz, 71% in the Kungoy, 68% in the Teskey Ala-Too Ranges; many small-scale glacial lakes are distributed in these ranges. The largest glacial lake is 0.116 km^2 in the Teskey Ala-Too Range. The elevation ranges of the glacial lakes in Kyrgyz (3608-3976 m) and Kungoy Ala-Too Ranges (3524-3941 m) is lower than that in Teskey Ala-Too Range (3699-4110 m). The river basins that have more than 20 glacial lakes in 2014 are located in Kyrgyz Ala-Too Range (Fig. 1). The distributions of glacial lakes are located in whole area of the Kyrgyz and Teskey Ala-Too Ranges. By contrast, the distribution of glacial lakes is concentrated in the central part of the

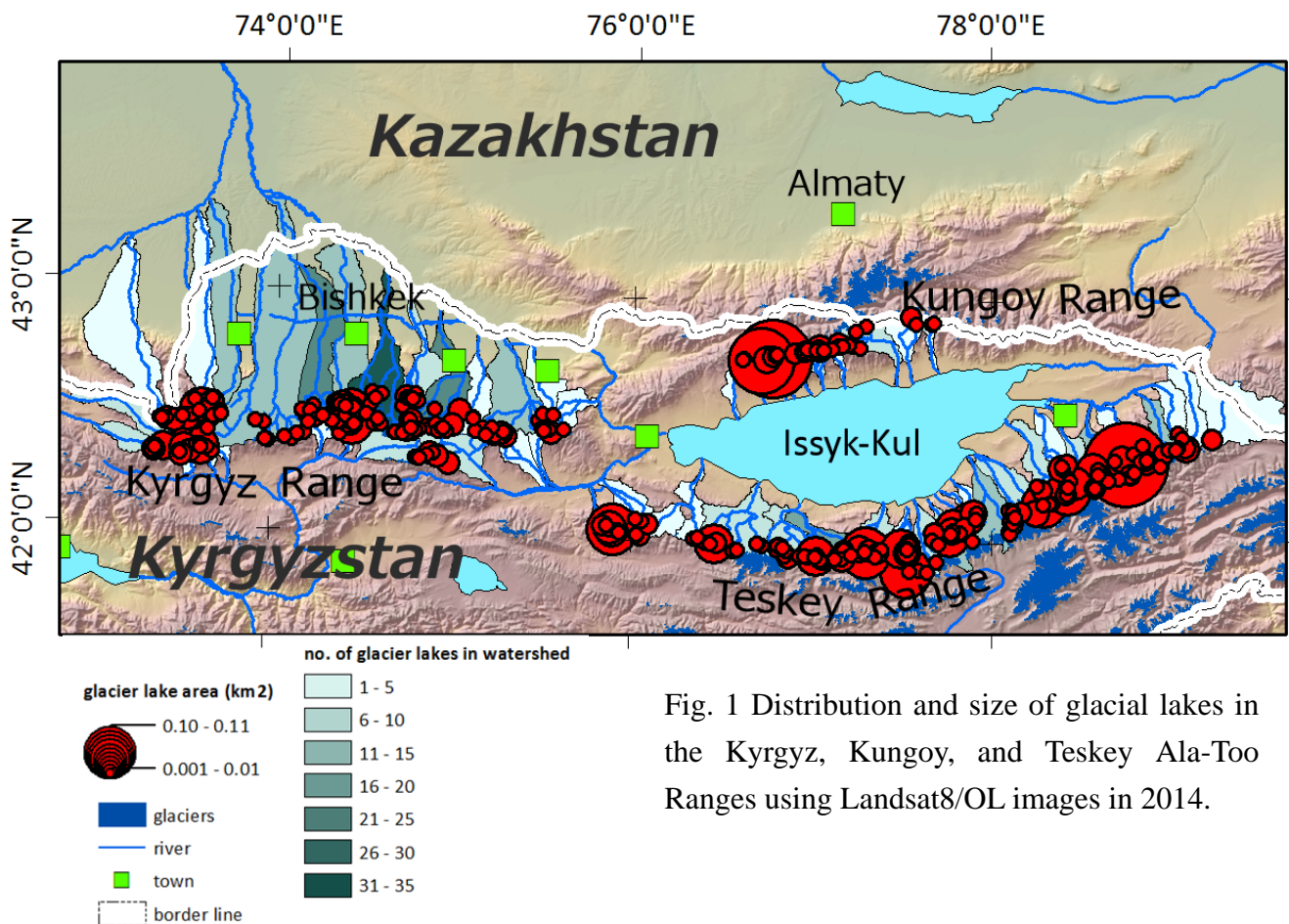


Fig. 1 Distribution and size of glacial lakes in the Kyrgyz, Kungoy, and Teskey Ala-Too Ranges using Landsat8/OL images in 2014.

Kungoy Ala-Too Range. Glacial lake types were classified as Type 1, glacier-contacted lakes; Type 2,

Table 1 Summary information for glacier lakes in the study area. The total number of glacier lakes (>0.001 km²) is 396.

Region	#	Lake area (km ²)		Elevation (m a.s.l.)		Area class (<0.01km ²)	
		ave.	max.	ave.	max.	#(%)	area(total)
Kyrgyz	198	0.006	0.047	3608	3976	158(80)	0.56(1.25)
Kungoy	38	0.012	0.104	3524	3941	27(71)	0.12(0.46)
Teskey	160	0.012	0.116	3699	4110	109(68)	0.48(1.86)
All	396	0.01				294(74)	1.16(3.57)

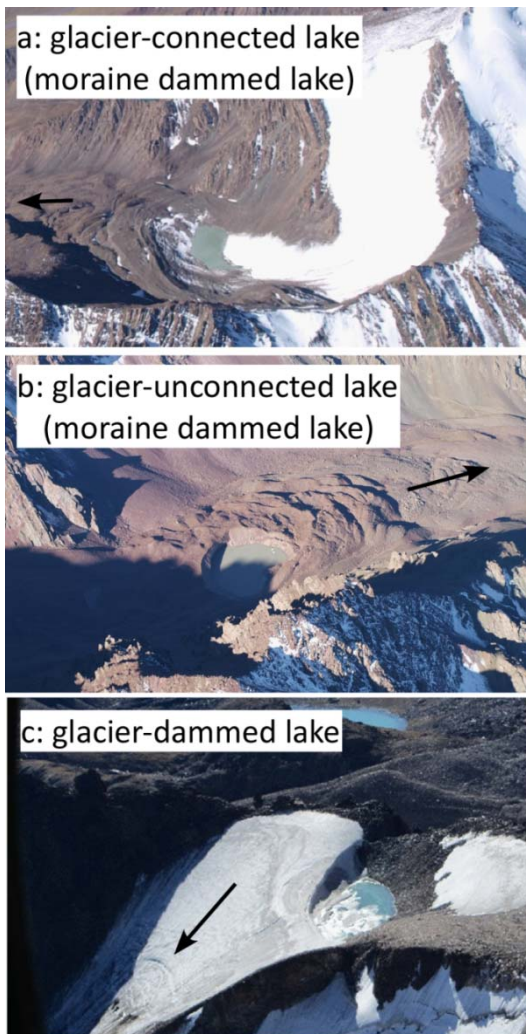


Fig.2 Type of glacial lake in the study area.

glacier-uncontacted lakes located on the moraine or dead-ice debris landform (supra-dead-ice lake: SDL); and Type 3, glacier-dammed lake (Fig. 2), the proportion of uncontacted glacial lakes (Type 2) is higher in the study area.

In an investigation of the type of glacial lakes that resulted in GLOFs in the past in Kyrgyz Ala-Too Range using Corona, Hexagon, and aerial photos, Takyr–Tor (June in 1992), Isha in western Karakol (July 1968), Tes–Tör in Ala–Archa (June 1953), Karagay–Blak (July 1966), Topkaragay (July 1974 and Aug 1993), At–Jairo in Keggeti (Aug 1952 and 1978), Keidokachkach in Sokluk (Aug 1983) were identified as glacier-contacted lakes, and Tes–Tör (July 2012) and Takyr–Tor (June 2009) as the uncontacted lake type. In the Teskey Ala-Too Range, Angy-Say (1980), Tez-Tor (2010), Kara-Teke (2014) were confirmed as the uncontacted lake type, Suuktor (1985), Kashka-Su (2006), w-Zyndan (2008), Jery-ui (2013) are as glacier-contacted lakes. These results show that GLOFs were associated with both glacier-contacted lakes and glacier-uncontacted lakes located on the dead-ice debris landform.

5. Recent GLOF in the northern Tien Shan

On 31 July 2012, a glacial lake outburst flood (GLOF) occurred at the Tes–Tör glacial lake in Ala–Archa National Park. The flood destroyed small bridges and caused confusion among residents of the Kashkasu and Bytik villages, who fled along the slopes and drove vehicles to

Bishkek. The dark waters of the flood were also observed in several canals in Bishkek. The flood reached Ala–Archa village around 10:00 am and Bytik hydro station at 11:14 am. Although the first wave had a relatively small impact, river discharge had doubled by noon.

Several GLOFs have occurred in the Teskey Ala-Too Range in recent years. Outburst floods from the Angy-Say glacier lake caused substantial flooding when drainage channels opened under the terminal moraine in 1974, 1975, and 1980 (Kubrushko and Staviskiy, 1978; Kubrushko and Shatrabin, 1982). The debris flood of the GLOF were especially powerful, but resulted in no downstream casualty. The Kashkasuu glacier lake in the southern part of the Teskey Ala-Too Range expanded suddenly in 2004–2005, and then discharged 144,000m³ in the summer of 2006 (Narama et al., 2011). The GLOF deposits covered a mountain road and a bridge along the Jyluu-Suu River. On 24 July 2008, a GLOF occurred at the western Zyndan glacier lake (437,000m³ was discharged) in the northern part of the Teskey Ala-Too Range (Narama et al., 2010). This event caused extensive damage, killing three people and many livestock and destroying a bridge, a road, two homes, and crops. This lake formed over 2.5 months following snowmelt in May 2008. On 15 Aug 2013, lake water (190,000m³) was discharged from Jery-Ui glacier lake (Narama et al., 2015). The flood type was debris flow with high sediment concentration, and broke bridge, irrigation channel, road, monuments, agriculture field, and wall of houses. On 17 July 2014, 120,000m³ was discharged from Kara-Teke glacier lake. The lake water was discharged through ice tunnel openings early summer.

Acknowledgements

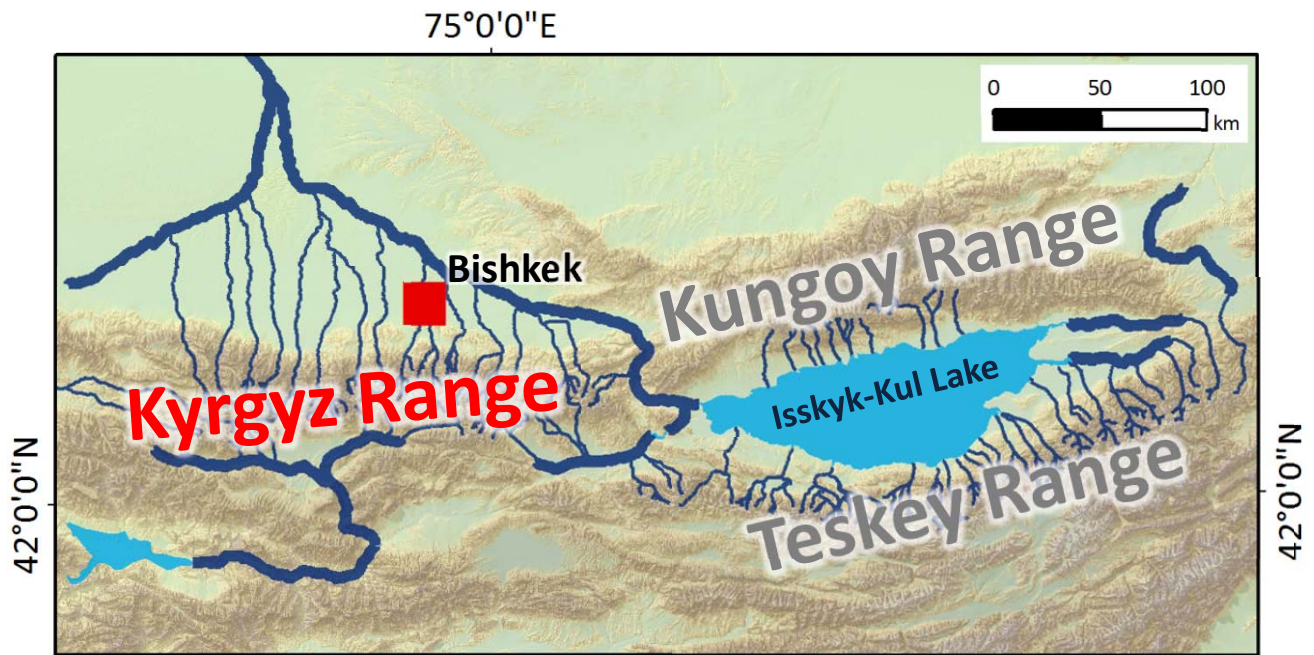
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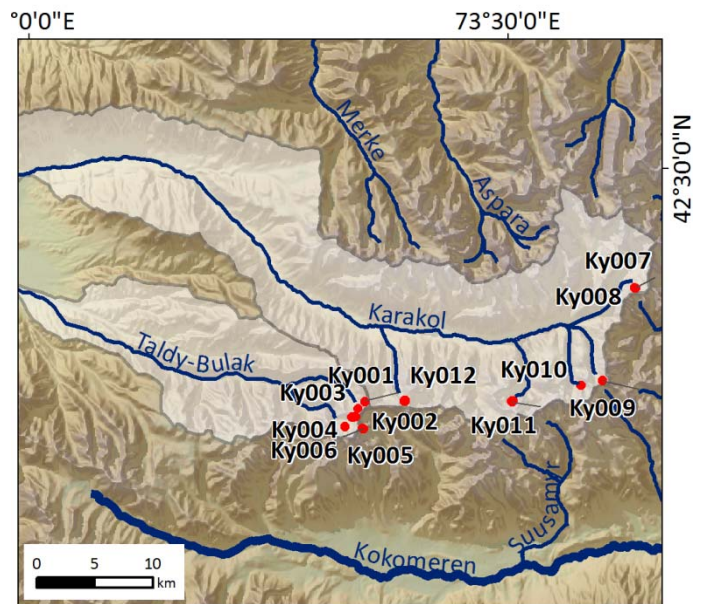
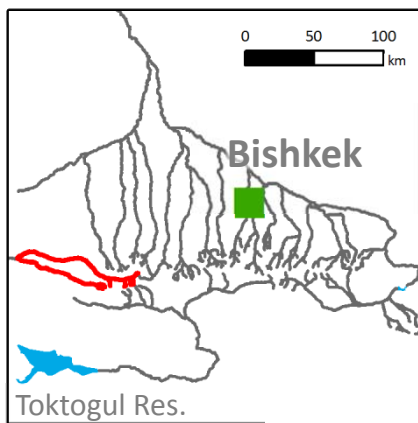
Kyrgyz Range



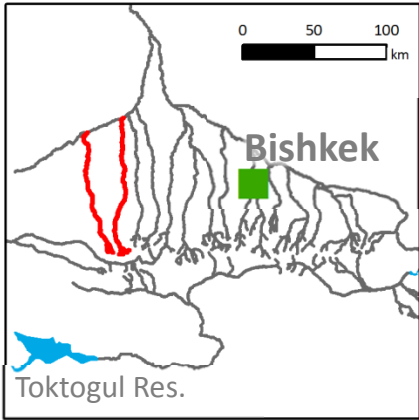
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Ky002	42deg 18' 37.341" N	73deg 21' 01.308" E	Landsat8	20140807	moraine dammed lake	Taldy-Bulak		0.003	3524
Ky003	42deg 18' 14.873" N	73deg 20' 51.318" E	Landsat8	20140807	moraine dammed lake(SDL)	Taldy-Bulak		0.011	3645
Ky004	42deg 18' 13.829" N	73deg 20' 42.304" E	Landsat8	20140807	moraine dammed lake(SDL)	Taldy-Bulak		0.014	3644
Ky005	42deg 17' 41.790" N	73deg 21' 21.960" E	Landsat8	20140807	moraine dammed lake	Iry-Suu		0.009	3645
Ky006	42deg 17' 46.329" N	73deg 20' 14.588" E	Landsat8	20140807	moraine dammed lake	Taldy-Bulak		0.006	3519
Ky007	42deg 24' 27.858" N	73deg 38' 16.105" E	Landsat8	20140807	moraine dammed lake	Karakol		0.003	3659
Ky008	42deg 24' 28.013" N	73deg 38' 10.632" E	Landsat8	20140807	moraine dammed lake(SDL)	Karakol		0.003	3656
Ky009	42deg 20' 07.521" N	73deg 36' 16.425" E	Landsat8	20140807	moraine dammed lake	Karakol		0.004	3654
Ky010	42deg 19' 52.902" N	73deg 34' 55.572" E	Landsat8	20140807	moraine dammed lake(SDL)	Karakol		0.006	3505
Ky011	42deg 19' 05.745" N	73deg 30' 39.601" E	Landsat8	20140807	moraine dammed lake	Karakol		0.022	3483
Ky012	42deg 19' 01.709" N	73deg 23' 56.296" E	Landsat8	20140807	moraine dammed lake	Karakol		0.024	3522
Ky013	42deg 26' 06.253" N	73deg 24' 49.475" E	Landsat8	20140807	moraine dammed lake(SDL)	Merke		0.015	3384
Ky014	42deg 26' 02.332" N	73deg 24' 29.641" E	Landsat8	20140807	moraine dammed lake	Merke		0.008	3364
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Ky028	42deg 27' 14.820" N	73deg 39' 49.334" E	Landsat8	20140807	moraine dammed lake	Chon-Kaiyndy		0.002	3553
Ky029	42deg 29' 37.537" N	73deg 37' 32.245" E	Landsat8	20140807	supraglacial lake	Chon-Kaiyndy		0.004	3949
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Ky183	42deg 18' 51.023" N	74deg 49' 17.080" E	Landsat8	20140901	moraine dammed lake(SDL)	Zal.Karakol		0.001	3623
Ky184	42deg 18' 52.210" N	74deg 49' 02.766" E	Landsat8	20140901	moraine dammed lake(SDL)	Zal.Karakol		0.001	3703
Ky185	42deg 18' 58.438" N	74deg 47' 50.330" E	Landsat8	20140901	moraine dammed lake	Zal.Karakol		0.003	3573
Ky186	42deg 19' 06.178" N	74deg 47' 45.914" E	Landsat8	20140901	moraine dammed lake(SDL)	Zal.Karakol		0.001	3582
Ky187	42deg 24' 13.769" N	74deg 22' 28.518" E	Landsat8	20140901	moraine dammed lake(SDL)	Ala-Archa		0.008	3587
Ky188	42deg 26' 07.926" N	74deg 25' 06.348" E	Landsat8	20140807	moraine dammed lake(SDL)	Ala-Archa		0.004	3670
Ky189	42deg 26' 50.250" N	74deg 11' 47.683" E	Landsat8	20140807	moraine dammed lake(SDL)	Sokuluk		0.001	3690
Ky190	42deg 18' 30.248" N	73deg 40' 12.217" E	Landsat8	20140807	moraine dammed lake(SDL)	Tokouluu		0.007	3497
Ky191	42deg 19' 27.465" N	73deg 38' 21.087" E	Landsat8	20140807	moraine dammed lake(SDL)	Tokouluu		0.004	3587
Ky192	42deg 19' 33.812" N	73deg 36' 10.385" E	Landsat8	20140807	moraine dammed lake(SDL)	Korumbu		0.009	3629
Ky193	42deg 19' 31.343" N	73deg 36' 15.456" E	Landsat8	20140807	moraine dammed lake(SDL)	Korumbu		0.031	3616
Ky194	42deg 19' 24.047" N	73deg 36' 11.568" E	Landsat8	20140807	moraine dammed lake(SDL)	Korumbu		0.001	3633
Ky195	42deg 19' 25.659" N	73deg 36' 16.510" E	Landsat8	20140807	moraine dammed lake(SDL)	Korumbu		0.002	3635
Ky196	42deg 17' 51.296" N	73deg 29' 24.138" E	Landsat8	20140807	moraine dammed lake	Suusamyr		0.004	3743
Ky197	42deg 17' 17.681" N	73deg 29' 52.868" E	Landsat8	20140807	moraine dammed lake(SDL)	Suusamyr		0.010	3540
Ky198	42deg 17' 59.925" N	73deg 32' 30.074" E	Landsat8	20140807	moraine dammed lake	Suusamyr		0.012	3647

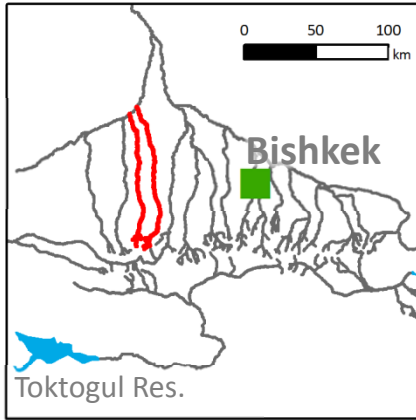
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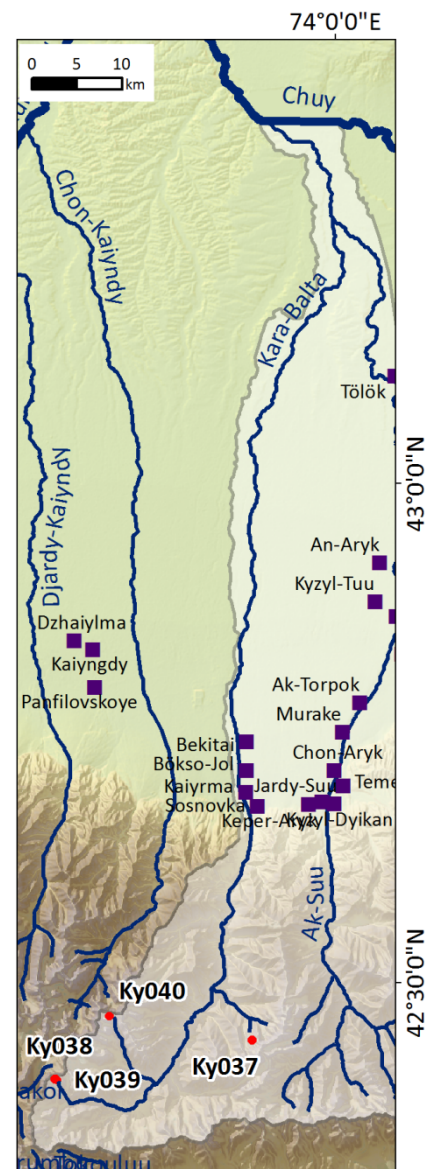
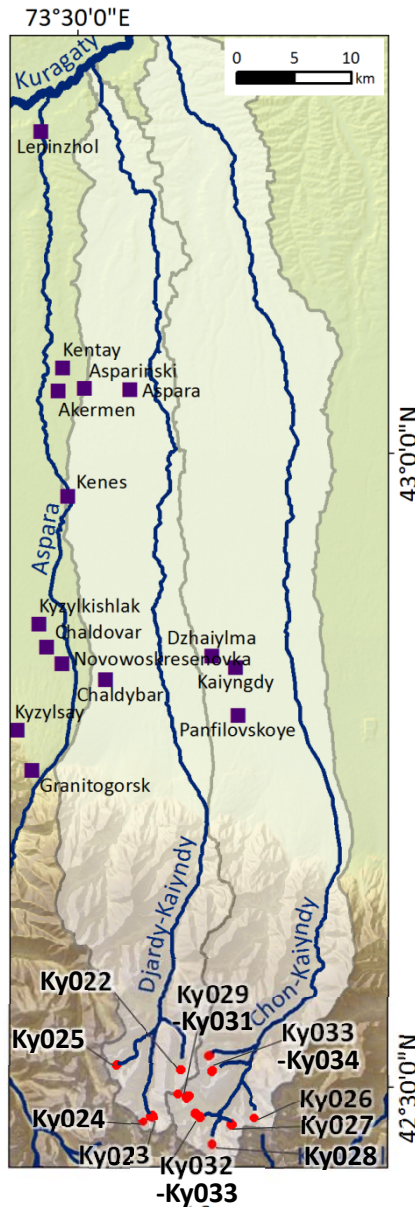
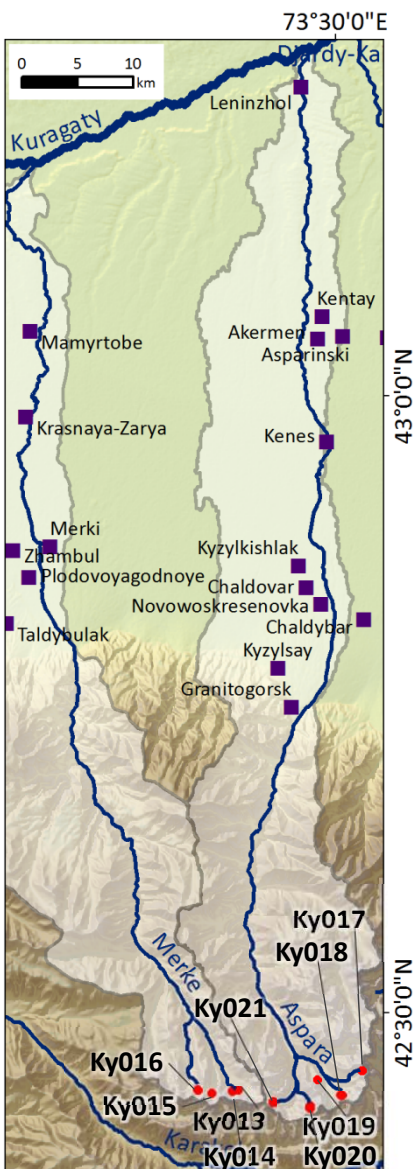
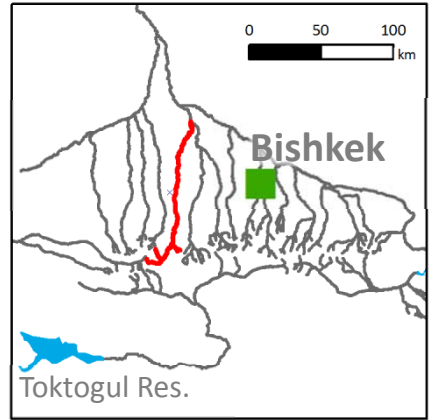
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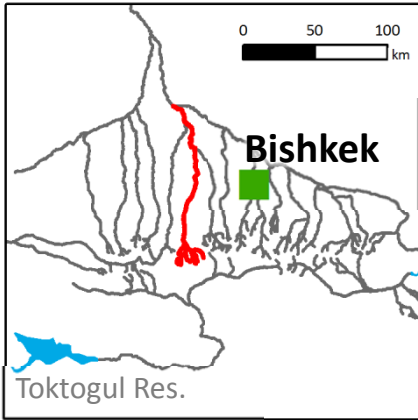
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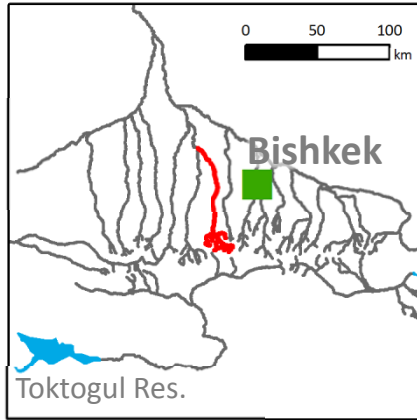
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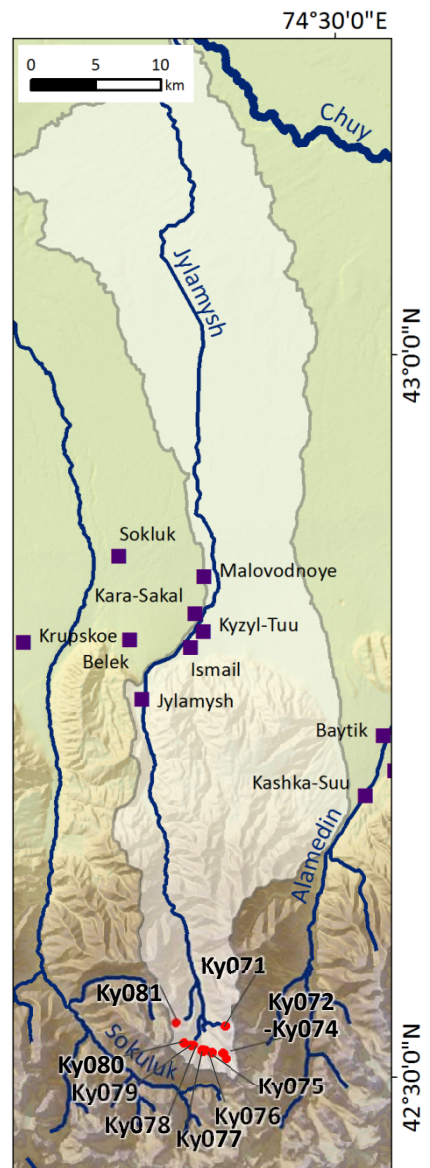
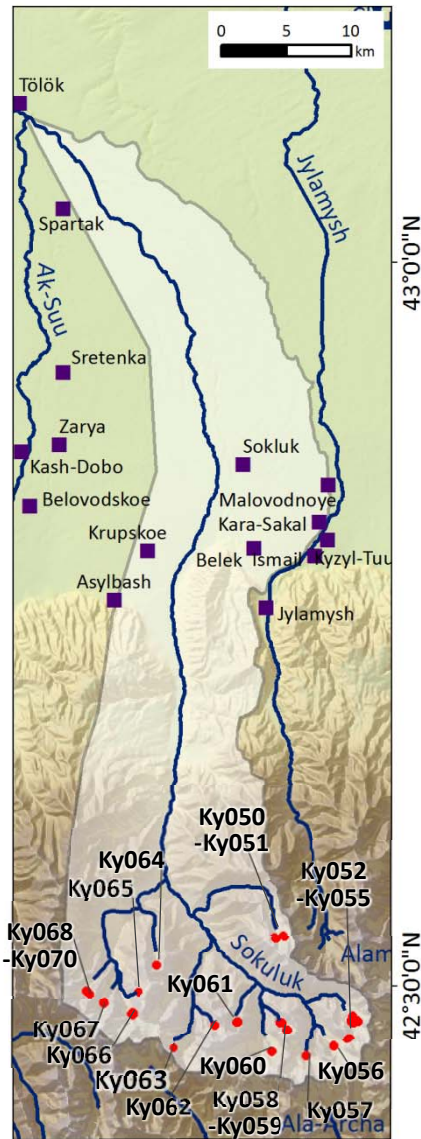
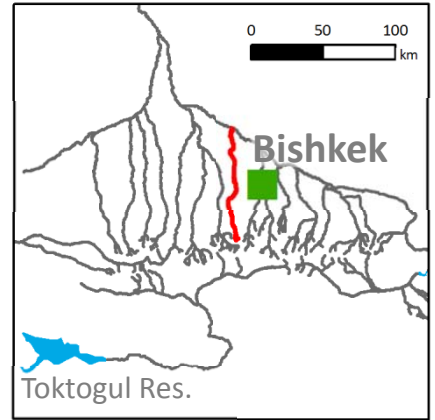
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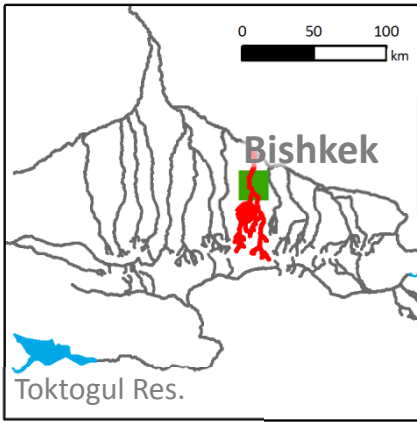
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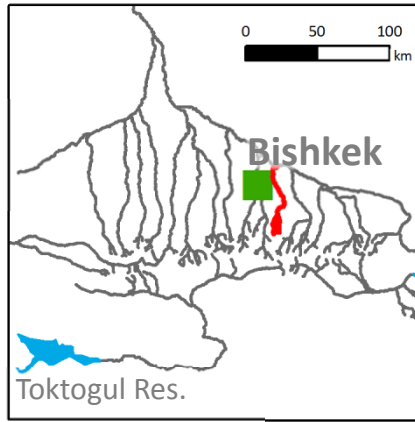
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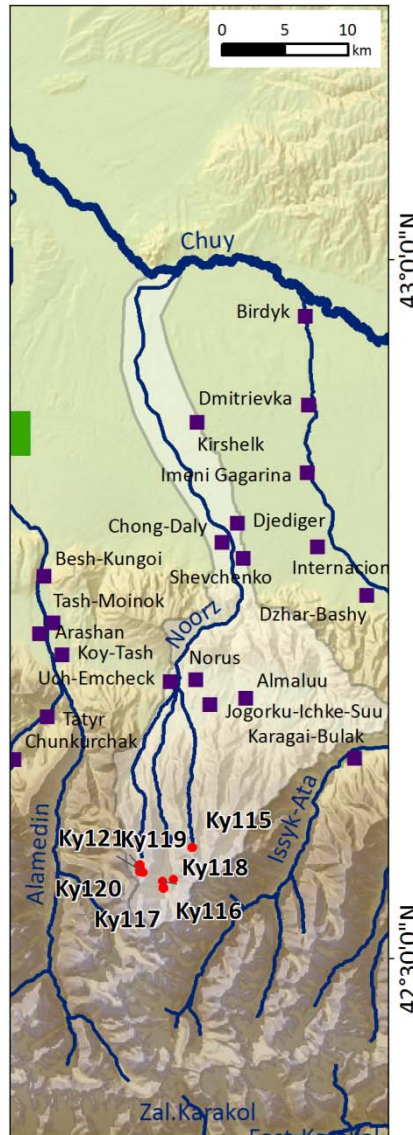
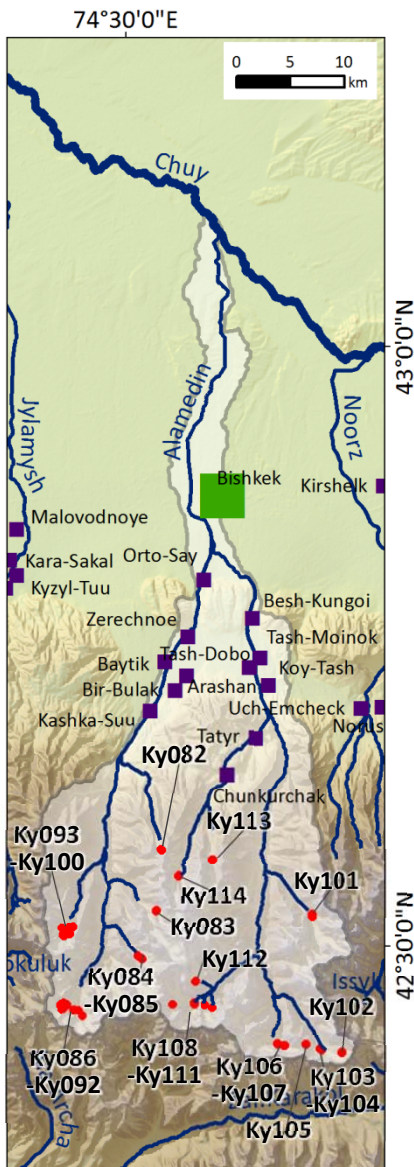
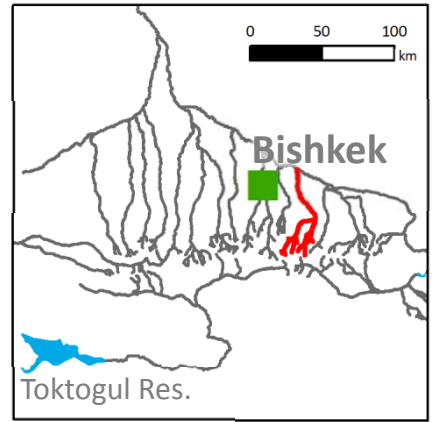
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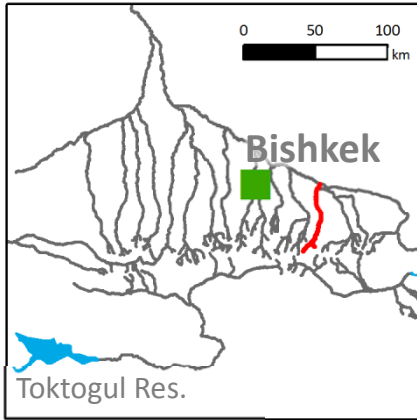
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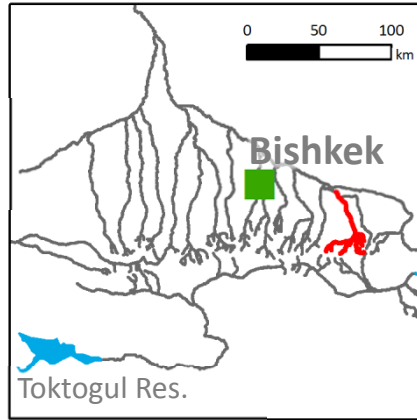
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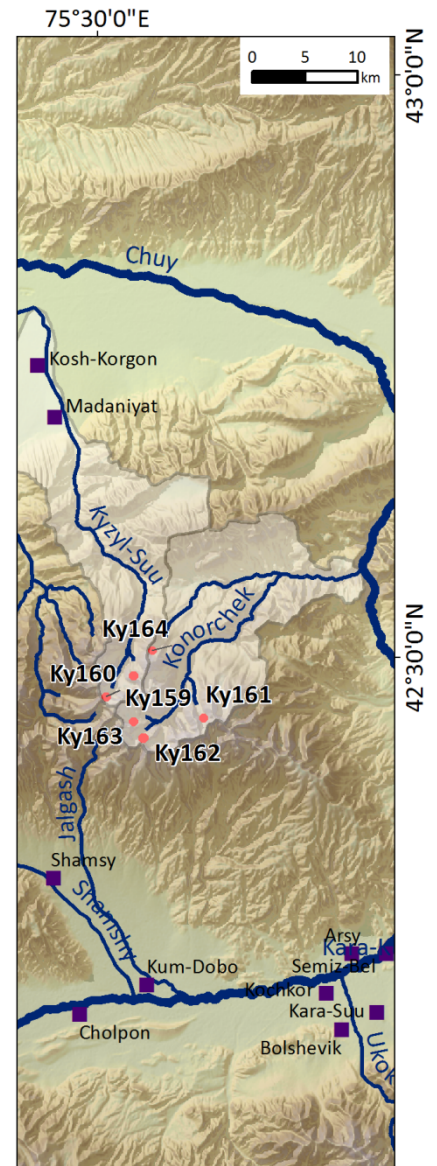
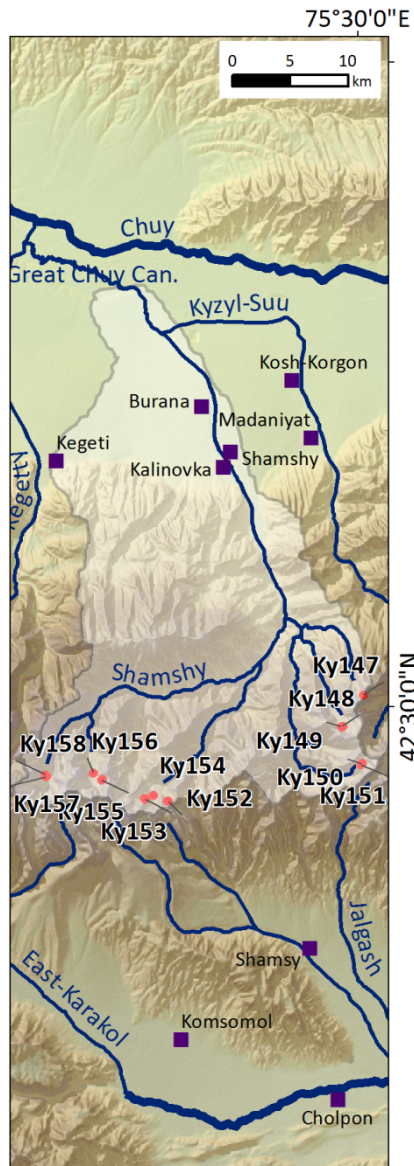
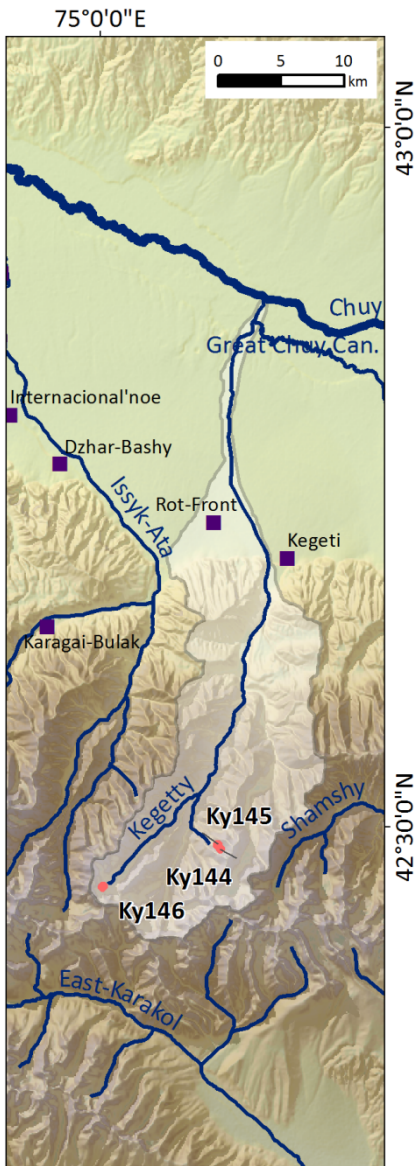
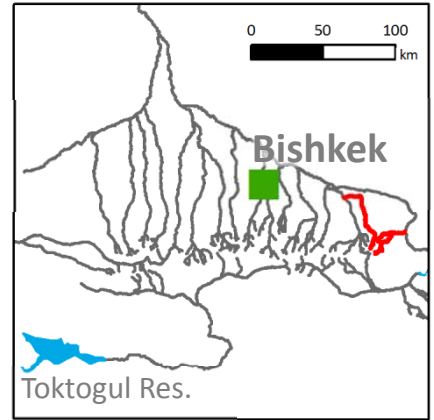
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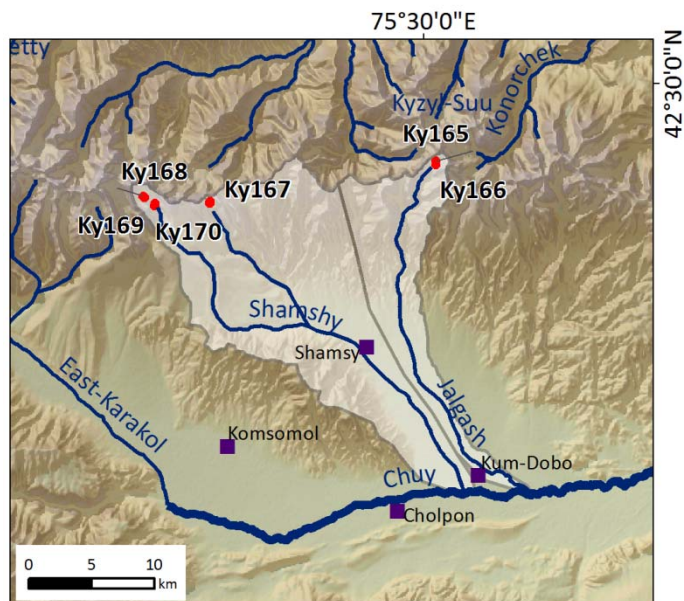
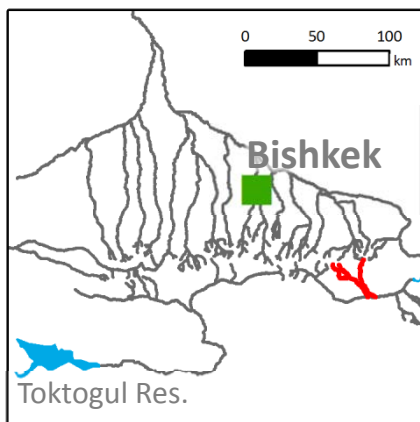
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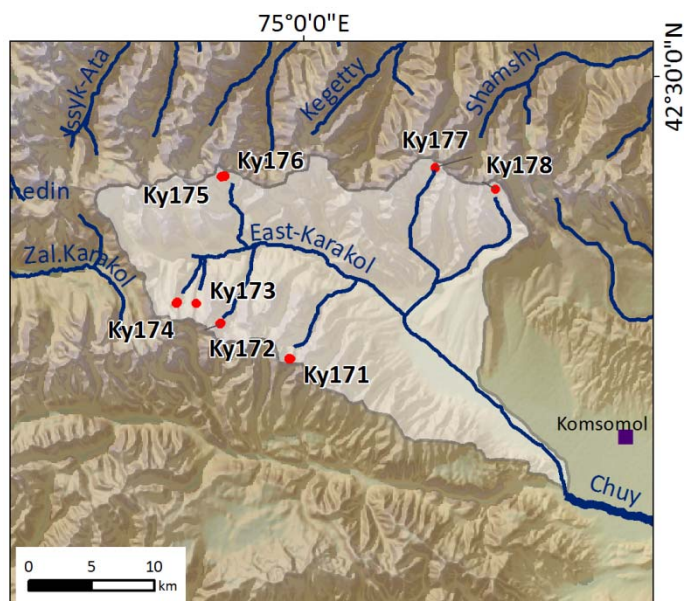
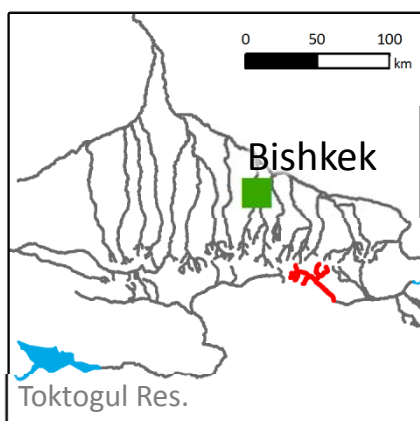
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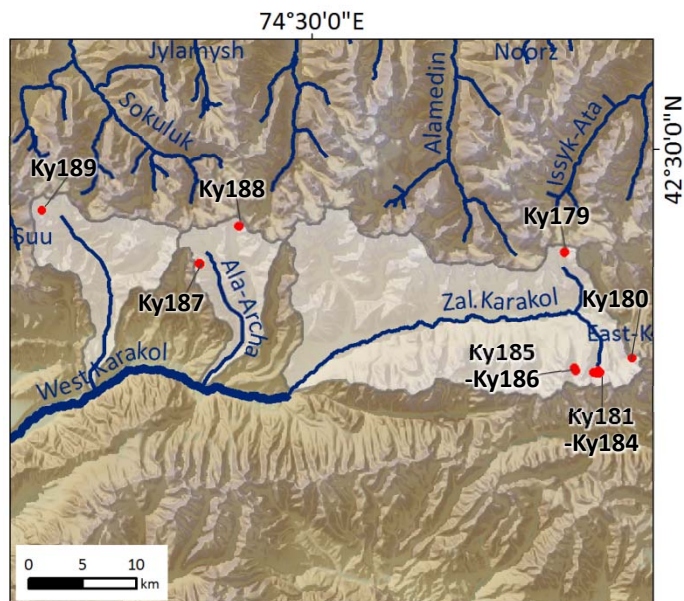
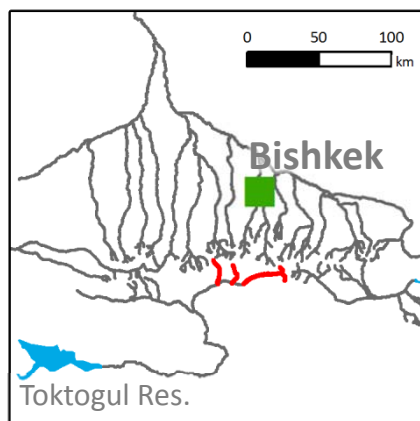
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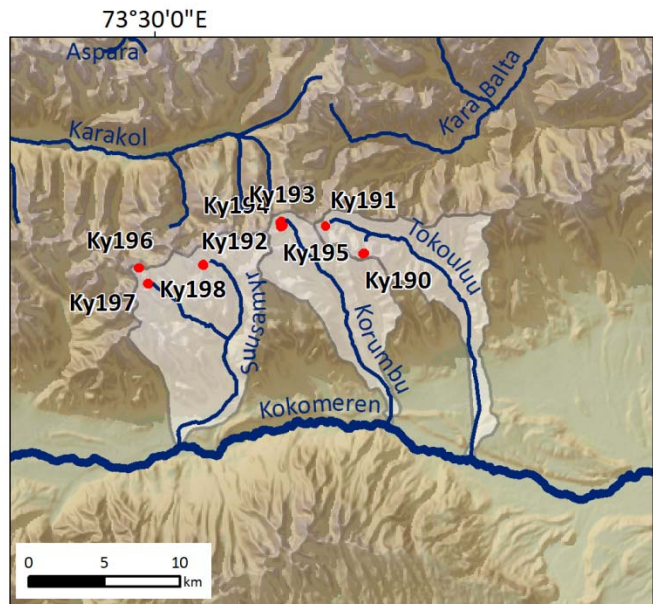
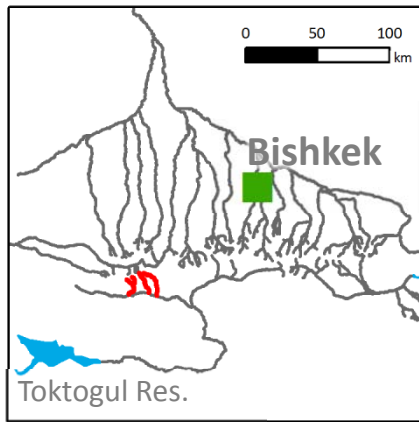


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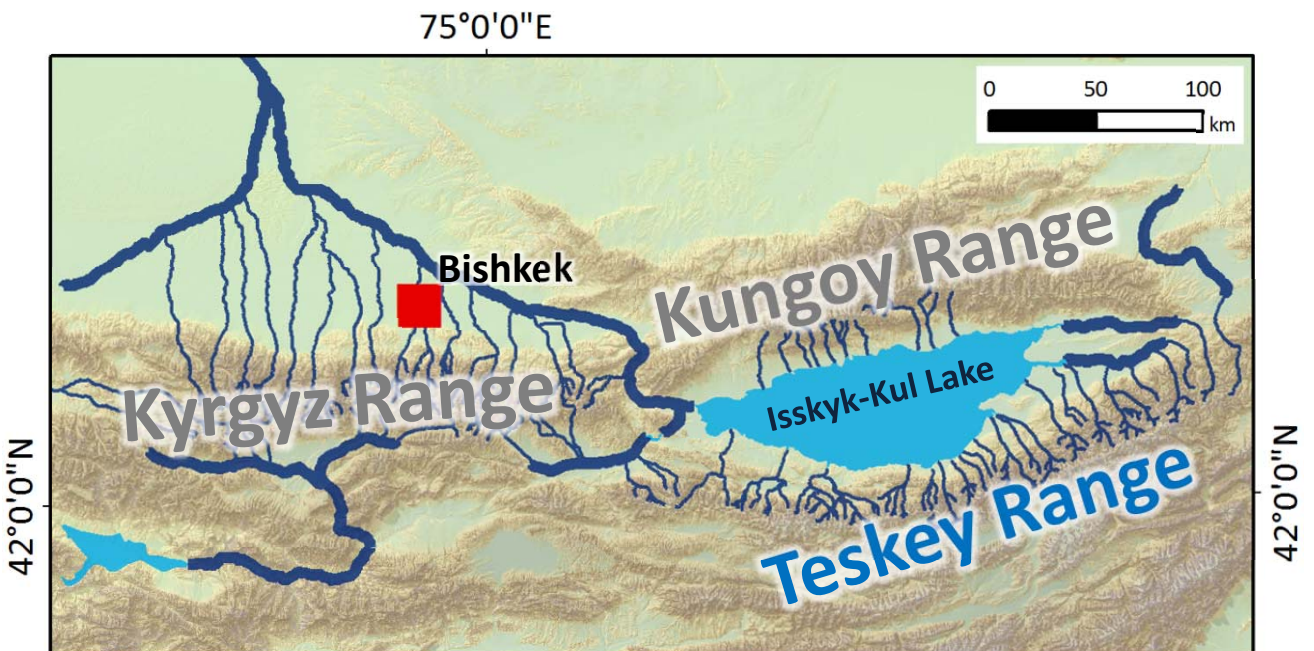


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Teskey Range

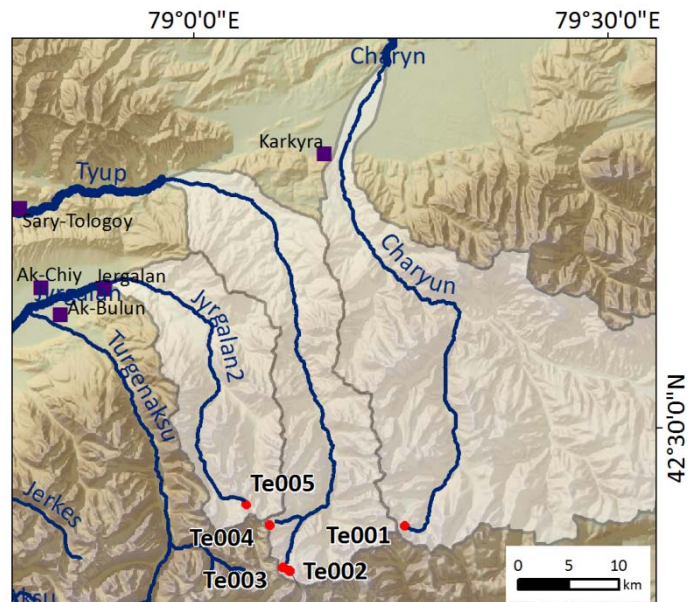
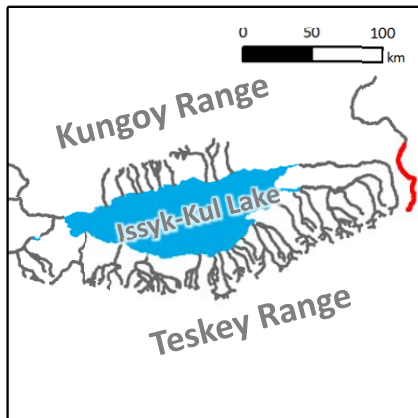


map ID	latitude	longitude	satellite	date	lake type	river basin	area	Elevation
Te001	42deg 25' 29.386" N	79deg 13' 29.473" E	Landsat 8	20140802	moraine dammed lake(SDL)	Tyup	0.01474	3684
Te002	42deg 23' 23.596" N	79deg 05' 03.201" E	Landsat 8	20140802	moraine dammed lake(SDL)	Tyup	0.02171	3711
Te003	42deg 23' 35.457" N	79deg 04' 35.411" E	Landsat 8	20140802	moraine dammed lake(SDL)	Tyup	0.01407	3656
Te004	42deg 25' 53.091" N	79deg 03' 46.456" E	Landsat 8	20140802	moraine dammed lake	Karkyra	0.00836	3704
Te005	42deg 27' 02.974" N	79deg 02' 08.706" E	Landsat 8	20140802	moraine dammed lake	Jyrgalan	0.00942	3613
Te006	42deg 23' 30.701" N	79deg 02' 13.619" E	Landsat 8	20140802	moraine dammed lake(SDL)	Turgenaksu	0.00516	3737
Te007	42deg 23' 02.988" N	79deg 01' 37.932" E	Landsat 8	20140802	moraine dammed lake(SDL)	Turgenaksu	0.00283	3654
Te008	42deg 23' 05.437" N	78deg 58' 55.697" E	Landsat 8	20140802	moraine dammed lake(SDL)	Turgenaksu	0.00384	3516
Te009	42deg 21' 57.126" N	78deg 57' 09.729" E	Landsat 8	20140802	moraine dammed lake(SDL)	Turgenaksu	0.01143	3678
Te010	42deg 19' 05.486" N	78deg 56' 11.310" E	Landsat 8	20140802	moraine dammed lake(SDL)	Turgenaksu	0.00104	3705
Te011	42deg 19' 01.621" N	78deg 56' 06.445" E	Landsat 8	20140802	moraine dammed lake(SDL)	Turgenaksu	0.00128	3703
Te012	42deg 19' 24.948" N	78deg 51' 45.742" E	Landsat 8	20140802	moraine dammed lake	Turgenaksu	0.0193	3882
Te013	42deg 20' 39.918" N	78deg 52' 58.146" E	Landsat 8	20140802	moraine dammed lake(SDL)	Turgenaksu	0.00583	3605
Te014	42deg 20' 34.194" N	78deg 51' 39.485" E	Landsat 8	20140802	moraine dammed lake(SDL)	Turgenaksu	0.00175	3660
Te015	42deg 20' 39.855" N	78deg 51' 25.508" E	Landsat 8	20140802	moraine dammed lake(SDL)	Turgenaksu	0.01084	3663
Te016	42deg 20' 56.362" N	78deg 51' 14.247" E	Landsat 8	20140802	moraine dammed lake(SDL)	Turgenaksu	0.00761	3736
Te017	42deg 24' 13.477" N	78deg 50' 18.066" E	Landsat 8	20140802	moraine dammed lake(SDL)	Jerkes	0.0068	3607
Te018	42deg 22' 04.567" N	78deg 47' 13.105" E	Landsat 8	20140802	moraine dammed lake(SDL)	Aksu	0.0092	3630
Te019	42deg 20' 12.230" N	78deg 49' 40.632" E	Landsat 8	20140802	moraine dammed lake(SDL)	Aksu	0.00198	3745
Te020	42deg 17' 25.622" N	78deg 47' 35.891" E	Landsat 7	20140725	moraine dammed lake(SDL)	Aksu	0.00164	3663
Te021	42deg 19' 31.888" N	78deg 44' 46.033" E	Landsat 7	20140725	moraine dammed lake	Aksu	0.11637	3529
Te022	42deg 20' 52.718" N	78deg 43' 35.982" E	Landsat 8	20140802	moraine dammed lake(SDL)	Arashan	0.02544	3537
Te023	42deg 19' 33.958" N	78deg 43' 09.528" E	Landsat 7	20140725	moraine dammed lake(SDL)	Arashan	0.02773	3425
Te024	42deg 20' 25.693" N	78deg 41' 04.551" E	Landsat 7	20140725	moraine dammed lake(SDL)	Arashan	0.00232	3597
Te025	42deg 16' 53.014" N	78deg 46' 13.350" E	Landsat 8	20140802	moraine dammed lake	Arashan	0.0138	3885
Te026	42deg 16' 33.644" N	78deg 46' 06.621" E	Landsat 8	20140802	moraine dammed lake(SDL)	Arashan	0.00973	3824
Te027	42deg 15' 53.472" N	78deg 42' 19.137" E	Landsat 8	20140802	moraine dammed lake(SDL)	Arashan	0.00289	3735
Te028	42deg 15' 23.430" N	78deg 39' 00.297" E	Landsat 8	20140802	moraine dammed lake	Arashan	0.00188	3902
Te029	42deg 17' 00.544" N	78deg 35' 23.424" E	Landsat 8	20140802	moraine dammed lake(SDL)	Arashan	0.00482	3700
Te030	42deg 17' 02.034" N	78deg 35' 29.907" E	Landsat 8	20140802	moraine dammed lake(SDL)	Arashan	0.00105	3698
Te031	42deg 18' 02.342" N	78deg 36' 01.011" E	Landsat 7	20140725	moraine dammed lake(SDL)	Arashan	0.00451	3577
Te032	42deg 18' 14.923" N	78deg 35' 22.129" E	Landsat 7	20140725	moraine dammed lake	Arashan	0.00278	3696
Te033	42deg 18' 22.022" N	78deg 33' 46.019" E	Landsat 7	20140725	moraine dammed lake	Karakol	0.03249	3614
Te034	42deg 13' 53.439" N	78deg 34' 31.204" E	Landsat 8	20140802	moraine dammed lake(SDL)	Karakol	0.00633	3743
Te035	42deg 13' 46.241" N	78deg 34' 26.314" E	Landsat 8	20140802	moraine dammed lake	Karakol	0.01585	3728
Te036	42deg 13' 45.789" N	78deg 34' 14.878" E	Landsat 8	20140802	moraine dammed lake(SDL)	Karakol	0.00555	3692
Te037	42deg 14' 57.677" N	78deg 27' 50.060" E	Landsat 8	20140802	moraine dammed lake	Karakol	0.03019	3646
Te038	42deg 15' 28.820" N	78deg 26' 15.358" E	Landsat 8	20140802	moraine dammed lake	Karakol	0.00937	3651
Te039	42deg 19' 42.954" N	78deg 25' 07.306" E	Landsat 8	20140802	moraine dammed lake	Irdyk	0.0142	3593
Te040	42deg 19' 04.960" N	78deg 23' 33.036" E	Landsat 8	20140802	moraine dammed lake(SDL)	Irdyk	0.00227	3632
Te041	42deg 18' 26.799" N	78deg 23' 36.680" E	Landsat 8	20140802	moraine dammed lake	Irdyk	0.0057	3561
Te042	42deg 18' 32.261" N	78deg 23' 12.836" E	Landsat 8	20140802	moraine dammed lake	Irdyk	0.02254	3519
Te043	42deg 14' 03.514" N	78deg 25' 26.755" E	Landsat 7	20140725	moraine dammed lake	Jety-Oguz	0.00618	3518
Te044	42deg 13' 59.148" N	78deg 25' 18.603" E	Landsat 7	20140725	moraine dammed lake(SDL)	Jety-Oguz	0.00228	3504
Te045	42deg 12' 48.500" N	78deg 25' 16.278" E	Landsat 7	20140725	moraine dammed lake	Jety-Oguz	0.05109	3650
Te046	42deg 12' 16.837" N	78deg 24' 55.761" E	Landsat 7	20140725	moraine dammed lake(SDL)	Jety-Oguz	0.00849	3461
Te047	42deg 12' 12.088" N	78deg 24' 50.242" E	Landsat 7	20140725	moraine dammed lake(SDL)	Jety-Oguz	0.01642	3440
Te048	42deg 10' 01.983" N	78deg 20' 04.376" E	Landsat 8	20140802	moraine dammed lake(SDL)	Jety-Oguz	0.00444	3293
Te049	42deg 09' 57.652" N	78deg 19' 19.059" E	Landsat 7	20140725	moraine dammed lake(SDL)	Jety-Oguz	0.00391	3697
Te050	42deg 13' 22.071" N	78deg 16' 40.984" E	Landsat 8	20140802	moraine dammed lake(SDL)	Jety-Oguz	0.01848	3631
Te051	42deg 14' 17.427" N	78deg 15' 04.701" E	Landsat 8	20140802	moraine dammed lake(SDL)	Jety-Oguz	0.00871	3595
Te052	42deg 09' 37.259" N	78deg 17' 24.870" E	Landsat 8	20140802	moraine dammed lake(SDL)	Chon-Kysyl-Su	0.05264	3372
Te053	42deg 09' 47.555" N	78deg 17' 12.207" E	Landsat 8	20140802	moraine dammed lake(SDL)	Chon-Kysyl-Su	0.00138	3341
Te054	42deg 07' 39.198" N	78deg 14' 42.554" E	Landsat 8	20140802	moraine dammed lake(SDL)	Chon-Kysyl-Su	0.02066	3580
Te055	42deg 05' 15.799" N	78deg 08' 14.324" E	Landsat 8	20140802	moraine dammed lake(SDL)	Chon-Kysyl-Su	0.00534	3989
Te056	42deg 07' 59.110" N	78deg 10' 01.783" E	Landsat 7	20140725	moraine dammed lake	Chon-Kysyl-Su	0.01283	3606
Te057	42deg 06' 33.384" N	78deg 07' 40.835" E	Landsat 7	20140725	moraine dammed lake(SDL)	Kichi-Kysylsu	0.00137	3720
Te058	42deg 06' 39.749" N	78deg 07' 52.266" E	Landsat 7	20140725	moraine dammed lake	Kichi-Kysylsu	0.00156	3628
Te059	42deg 08' 02.340" N	78deg 07' 11.670" E	Landsat 7	20140725	moraine dammed lake	Kichi-Kysylsu	0.00425	3774
Te060	42deg 08' 13.834" N	78deg 06' 55.978" E	Landsat 7	20140725	moraine dammed lake(SDL)	Kichi-Kysylsu	0.00703	3782
Te061	42deg 08' 29.167" N	78deg 05' 48.388" E	Landsat 8	20140802	moraine dammed lake(SDL)	Kichi-Kysylsu	0.00746	3605
Te062	42deg 05' 42.718" N	78deg 07' 15.852" E	Landsat 7	20140725	moraine dammed lake	Juukuchack (Juuku)	0.01914	3934
Te063	42deg 05' 03.858" N	78deg 07' 10.276" E	Landsat 8	20140802	moraine dammed lake(SDL)	Juukuchack (Juuku)	0.00156	3822
Te064	42deg 04' 14.709" N	78deg 07' 38.319" E	Landsat 8	20140802	moraine dammed lake(SDL)	Juukuchack (Juuku)	0.00355	3864
Te065	42deg 03' 57.582" N	78deg 07' 03.146" E	Landsat 8	20140802	moraine dammed lake(SDL)	Juukuchack (Juuku)	0.00736	3679
Te066	42deg 02' 36.502" N	78deg 05' 56.710" E	Landsat 8	20140802	moraine dammed lake(SDL)	Juukuchack (Juuku)	0.00262	3663
Te067	42deg 02' 50.403" N	78deg 05' 59.067" E	Landsat 8	20140802	moraine dammed lake(SDL)	Juukuchack (Juuku)	0.00698	3627
Te068	42deg 03' 05.422" N	78deg 05' 40.555" E	Landsat 7	20140725	moraine dammed lake(SDL)	Juukuchack (Juuku)	0.00428	3612
Te069	42deg 00' 40.915" N	77deg 53' 45.689" E	Landsat 8	20140802	moraine dammed lake(SDL)	Juukuchack (Juuku)	0.00204	3779
Te070	42deg 00' 48.915" N	77deg 53' 37.025" E	Landsat 8	20140802	moraine dammed lake(SDL)	Juukuchack (Juuku)	0.00499	3793

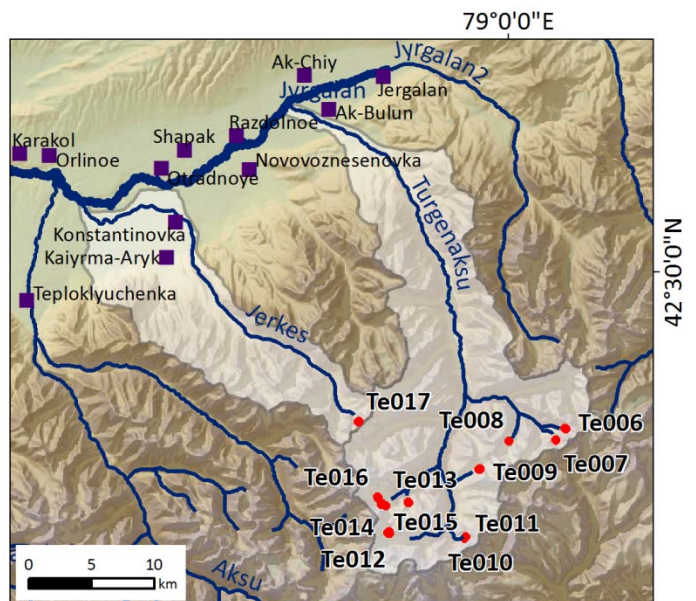
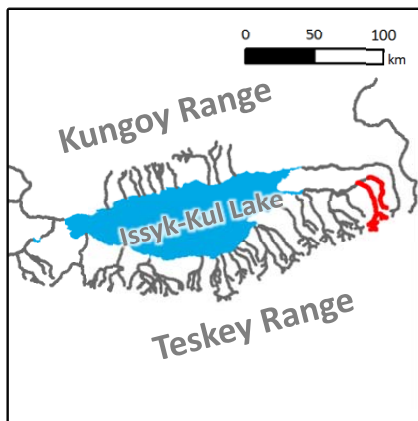
map ID	latitude	longitude	satellite	date	lake type	river basin	area	Elevation
Te071	42deg 06' 10.711" N	77deg 54' 49.436" E	Landsat 7	20140725	moraine dammed lake(SDL)	Juukuchack (Juuku)	0.0011	3647
Te072	42deg 07' 35.994" N	77deg 54' 56.690" E	Landsat 7	20140725	moraine dammed lake(SDL)	Juukuchack (Juuku)	0.0046	3669
Te073	42deg 07' 35.611" N	77deg 53' 55.458" E	Landsat 7	20140725	moraine dammed lake	Chychkan	0.02057	3620
Te074	42deg 06' 29.806" N	77deg 52' 10.165" E	Landsat 7	20140725	moraine dammed lake(SDL)	Ak-Terek	0.03748	3444
Te075	42deg 04' 08.722" N	77deg 51' 02.540" E	Landsat 8	20140802	moraine dammed lake	Kichi-Jargylchack	0.01354	3874
Te076	42deg 03' 16.652" N	77deg 50' 56.507" E	Landsat 8	20140802	moraine dammed lake	Kichi-Jargylchack	0.01376	3740
Te077	42deg 02' 42.125" N	77deg 49' 28.305" E	Landsat 8	20140802	moraine dammed lake	Kichi-Jargylchack	0.00979	3750
Te078	42deg 04' 32.337" N	77deg 47' 14.372" E	Landsat 8	20140802	moraine dammed lake	Chon-Jargylchack	0.0373	3777
Te079	42deg 03' 14.542" N	77deg 47' 02.856" E	Landsat 7	20140725	moraine dammed lake	Chon-Jargylchack	0.00202	3835
Te080	42deg 03' 22.835" N	77deg 46' 42.646" E	Landsat 7	20140725	moraine dammed lake(SDL)	Chon-Jargylchack	0.02266	3711
Te081	42deg 02' 29.683" N	77deg 46' 31.406" E	Landsat 8	20140802	moraine dammed lake(SDL)	Chon-Jargylchack	0.00378	3809
Te082	42deg 02' 31.707" N	77deg 46' 29.864" E	Landsat 8	20140802	moraine dammed lake(SDL)	Chon-Jargylchack	0.00104	3811
Te083	42deg 01' 44.601" N	77deg 46' 51.153" E	Landsat 8	20140802	moraine dammed lake	Chon-Jargylchack	0.00256	3886
Te084	42deg 01' 46.544" N	77deg 46' 06.092" E	Landsat 8	20140802	moraine dammed lake(SDL)	Chon-Jargylchack	0.04561	3708
Te085	41deg 59' 58.924" N	77deg 42' 21.482" E	Landsat 8	20140802	moraine dammed lake(SDL)	Chon-Jargylchack	0.00348	3878
Te086	42deg 02' 47.319" N	77deg 41' 04.680" E	Landsat 8	20140802	moraine dammed lake	Chon-Jargylchack	0.01349	3655
Te087	42deg 01' 04.033" N	77deg 40' 11.961" E	Landsat 8	20140802	moraine dammed lake	Barskoon	0.0064	3908
Te088	41deg 55' 37.718" N	77deg 41' 46.871" E	Landsat 8	20140802	moraine dammed lake(SDL)	Barskoon	0.00623	3677
Te089	41deg 53' 03.773" N	77deg 38' 34.051" E	Landsat 7	20140902	moraine dammed lake	Barskoon	0.00369	4110
Te090	41deg 53' 25.082" N	77deg 35' 44.041" E	Landsat 7	20140902	moraine dammed lake(SDL)	Barskoon	0.00415	3792
Te091	41deg 53' 11.718" N	77deg 32' 45.880" E	Landsat 7	20140725	moraine dammed lake	Barskoon	0.004	3811
Te092	41deg 53' 03.206" N	77deg 31' 39.552" E	Landsat 7	20140902	moraine dammed lake(SDL)	Barskoon	0.067	3747
Te093	41deg 57' 58.227" N	77deg 31' 57.294" E	Landsat 7	20140902	moraine dammed lake(SDL)	Barskoon	0.02943	3836
Te094	41deg 57' 51.893" N	77deg 31' 50.053" E	Landsat 7	20140902	moraine dammed lake(SDL)	Barskoon	0.01276	3836
Te095	41deg 59' 59.005" N	77deg 32' 32.449" E	Landsat 7	20140902	moraine dammed lake	Tamga	0.0051	3633
Te096	42deg 00' 37.718" N	77deg 32' 14.338" E	Landsat 7	20140902	moraine dammed lake(SDL)	Tamga	0.00693	3826
Te097	41deg 58' 43.989" N	77deg 32' 09.537" E	Landsat 7	20140902	moraine dammed lake(SDL)	Tamga	0.00329	3739
Te098	41deg 58' 55.984" N	77deg 31' 59.562" E	Landsat 7	20140902	moraine dammed lake(SDL)	Tamga	0.00374	3704
Te099	41deg 58' 54.478" N	77deg 29' 46.034" E	Landsat 7	20140902	moraine dammed lake	Tamga	0.04112	3748
Te100	41deg 58' 27.398" N	77deg 23' 24.520" E	Landsat 7	20140902	moraine dammed lake	Tosor	0.00491	3861
Te101	41deg 57' 44.368" N	77deg 22' 24.994" E	Landsat 7	20140902	moraine dammed lake	Tosor	0.01096	3853
Te102	41deg 56' 52.370" N	77deg 21' 19.161" E	Landsat 7	20140902	moraine dammed lake	Tosor	0.00358	3770
Te103	41deg 57' 20.148" N	77deg 20' 37.759" E	Landsat 7	20140902	moraine dammed lake	Tosor	0.00814	3838
Te104	41deg 58' 27.780" N	77deg 19' 21.907" E	Landsat 7	20140902	moraine dammed lake(SDL)	Tosor	0.01302	3884
Te105	41deg 57' 34.198" N	77deg 18' 09.763" E	Landsat 7	20140902	moraine dammed lake	Tosor	0.0049	3802
Te106	41deg 57' 52.285" N	77deg 18' 12.676" E	Landsat 7	20140902	moraine dammed lake(SDL)	Tosor	0.0606	3688
Te107	41deg 58' 01.653" N	77deg 17' 44.627" E	Landsat 7	20140902	moraine dammed lake(SDL)	Tosor	0.00219	3653
Te108	41deg 58' 39.934" N	77deg 16' 01.017" E	Landsat 7	20140902	moraine dammed lake	Tosor	0.02589	3760
Te109	41deg 57' 21.277" N	77deg 13' 18.272" E	Landsat 7	20140902	moraine dammed lake	Ton	0.00222	3845
Te110	41deg 58' 21.755" N	77deg 10' 56.836" E	Landsat 7	20140902	moraine dammed lake	Ton	0.01202	3769
Te111	41deg 58' 32.852" N	77deg 11' 05.049" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.0065	3705
Te112	41deg 56' 15.400" N	77deg 10' 22.132" E	Landsat 7	20140902	moraine dammed lake	Ton	0.00499	3961
Te113	41deg 56' 31.901" N	77deg 10' 18.642" E	Landsat 7	20140902	moraine dammed lake	Ton	0.02607	3921
Te114	41deg 56' 06.716" N	77deg 07' 55.789" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00362	3682
Te115	41deg 55' 28.100" N	77deg 05' 08.061" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00791	3646
Te116	41deg 55' 24.268" N	77deg 03' 58.331" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00358	3723
Te117	41deg 55' 18.896" N	77deg 03' 43.578" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00734	3706
Te118	41deg 55' 39.674" N	77deg 02' 49.543" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00217	3714
Te119	41deg 55' 42.983" N	77deg 03' 08.421" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00274	3673
Te120	41deg 55' 47.270" N	77deg 03' 09.142" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00172	3661
Te121	41deg 56' 37.289" N	77deg 01' 18.011" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00118	3764
Te122	41deg 56' 52.542" N	77deg 01' 47.216" E	Landsat 7	20140902	moraine dammed lake	Ton	0.04036	3641
Te123	41deg 57' 03.794" N	77deg 01' 56.472" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00837	3670
Te124	41deg 56' 43.690" N	76deg 58' 55.431" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00438	3592
Te125	41deg 56' 54.366" N	76deg 58' 02.519" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00344	3579
Te126	41deg 56' 44.639" N	76deg 56' 09.866" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00766	3543
Te127	41deg 56' 16.739" N	76deg 52' 26.309" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.01506	3521
Te128	41deg 56' 51.025" N	76deg 51' 27.957" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00707	3567
Te129	41deg 58' 04.985" N	76deg 51' 55.014" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00204	3748
Te130	41deg 58' 51.778" N	76deg 50' 32.716" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00179	3667
Te131	41deg 58' 41.807" N	76deg 49' 14.375" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.01137	3754
Te132	41deg 59' 13.388" N	76deg 48' 51.885" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00506	3812
Te133	41deg 59' 12.841" N	76deg 43' 53.303" E	Landsat 7	20140902	moraine dammed lake(SDL)	Ton	0.00559	3740
Te134	41deg 59' 53.207" N	76deg 42' 16.251" E	Landsat 8	20140901	moraine dammed lake(SDL)	Ak-Terek	0.00371	3599
Te135	41deg 59' 52.944" N	76deg 41' 57.474" E	Landsat 8	20140901	moraine dammed lake(SDL)	Ak-Terek	0.00158	3713
Te136	41deg 58' 14.966" N	76deg 35' 29.316" E	Landsat 8	20140901	moraine dammed lake(SDL)	Ak-Terek	0.003	3503
Te137	41deg 57' 57.883" N	76deg 34' 06.922" E	Landsat 8	20140901	moraine dammed lake	Ak-Terek	0.00488	3655
Te138	41deg 59' 28.501" N	76deg 28' 00.820" E	Landsat 8	20140901	moraine dammed lake	Ak-Terek	0.04019	3852
Te139	41deg 59' 52.308" N	76deg 28' 37.137" E	Landsat 8	20140901	moraine dammed lake	Ak-Terek	0.01422	3914
Te140	41deg 59' 30.662" N	76deg 26' 28.932" E	Landsat 8	20140901	moraine dammed lake(SDL)	Ak-Terek	0.00208	3632

map ID	latitude	longitude	satellite	date	lake type	river basin	area	Elevation
Te141	41deg 59' 33.376" N	76deg 26' 35.364" E	Landsat 8	20140901	moraine dammed lake(SDL)	Ak-Terek	0.00176	3621
Te142	41deg 59' 42.849" N	76deg 24' 55.360" E	Landsat 8	20140901	moraine dammed lake	Ak-Terek	0.00788	3590
Te143	42deg 00' 56.677" N	76deg 22' 32.964" E	Landsat 8	20140901	moraine dammed lake(SDL)	Ak-Terek	0.00108	3637
Te144	42deg 00' 46.155" N	76deg 21' 52.512" E	Landsat 8	20140901	moraine dammed lake	Tuura-Su	0.00771	3575
Te145	42deg 00' 49.551" N	76deg 21' 11.184" E	Landsat 8	20140901	moraine dammed lake	Tuura-Su	0.00136	3656
Te146	42deg 01' 18.312" N	76deg 03' 04.828" E	Landsat 8	20140901	moraine dammed lake(SDL)	Tuura-Su	0.01938	3777
Te147	42deg 04' 12.447" N	76deg 05' 43.246" E	Landsat 8	20140901	moraine dammed lake	Kara-Kungoy	0.01323	4051
Te148	42deg 04' 47.931" N	76deg 03' 39.896" E	Landsat 8	20140901	moraine dammed lake	Kara-Kungoy	0.00844	3744
Te149	42deg 05' 17.885" N	76deg 01' 39.114" E	Landsat 8	20140901	moraine dammed lake(SDL)	Kara-Kungoy	0.0034	3700
Te150	42deg 01' 25.062" N	76deg 02' 13.663" E	Landsat 8	20140901	moraine dammed lake	Ukok	0.00396	3910
Te151	42deg 01' 14.038" N	76deg 02' 13.218" E	Landsat 8	20140901	moraine dammed lake	Ukok	0.00557	3894
Te152	42deg 01' 51.547" N	75deg 56' 23.799" E	Landsat 8	20140901	moraine dammed lake	Ukok	0.00131	3746
Te153	42deg 02' 01.111" N	75deg 56' 44.007" E	Landsat 8	20140901	moraine dammed lake	Ukok	0.00918	3621
Te154	42deg 02' 26.551" N	75deg 55' 49.907" E	Landsat 8	20140901	moraine dammed lake(SDL)	Ukok	0.00255	3634
Te155	42deg 02' 28.113" N	75deg 53' 41.428" E	Landsat 8	20140901	moraine dammed lake	Ukok	0.03804	3660
Te156	42deg 02' 46.207" N	75deg 53' 59.509" E	Landsat 8	20140901	moraine dammed lake	Ukok	0.06046	3543
Te157	42deg 02' 41.569" N	75deg 53' 15.453" E	Landsat 8	20140901	moraine dammed lake	Ukok	0.0026	3827
Te158	42deg 03' 10.381" N	75deg 53' 07.464" E	Landsat 8	20140901	moraine dammed lake	Ukok	0.03064	3653
Te159	42deg 03' 31.610" N	75deg 52' 00.275" E	Landsat 8	20140901	moraine dammed lake	Ukok	0.00235	3752
Te160	42deg 03' 30.564" N	75deg 50' 38.214" E	Landsat 8	20140901	moraine dammed lake	Ukok	0.01517	3569

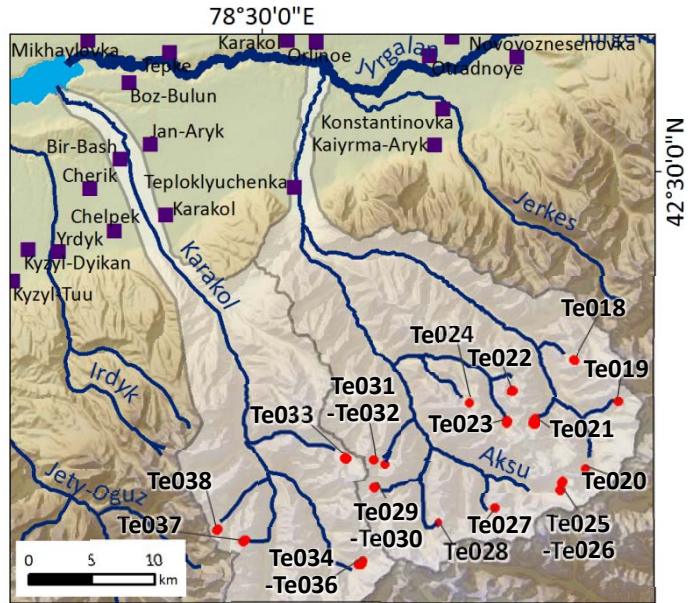
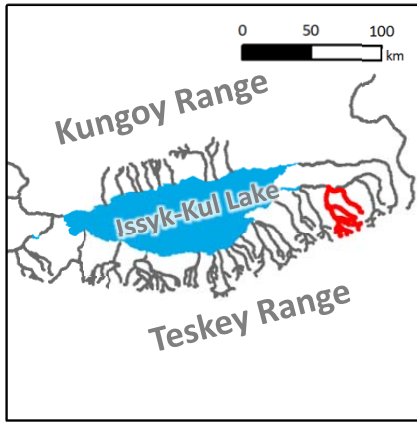
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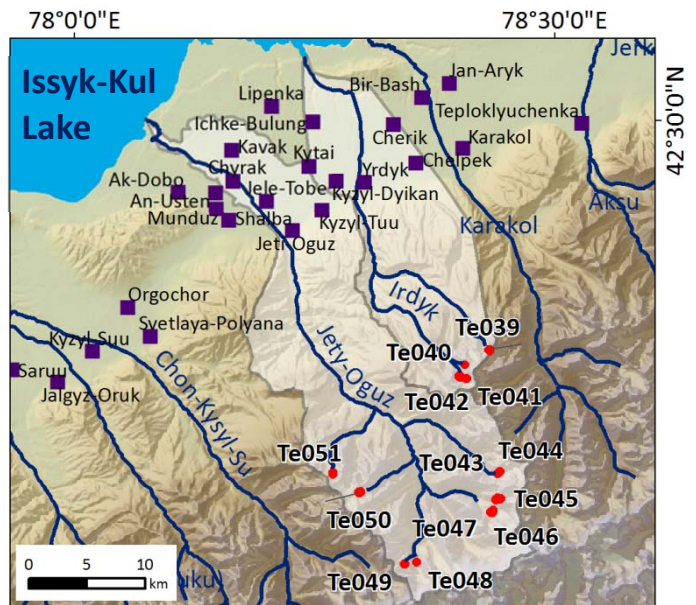
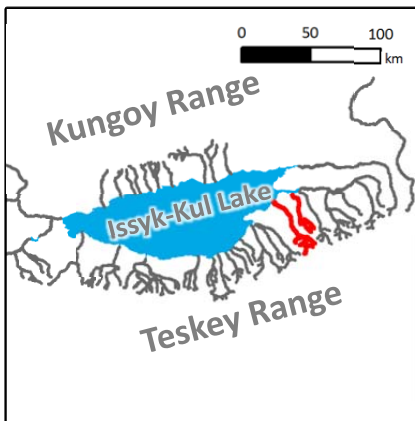
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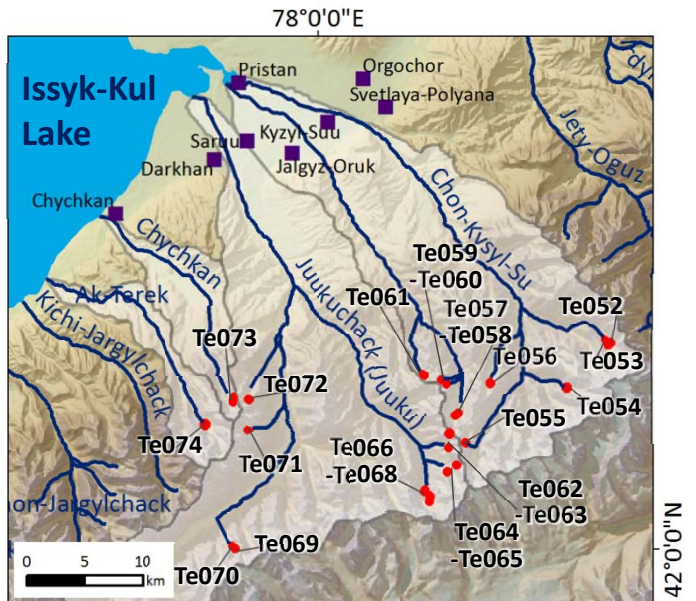
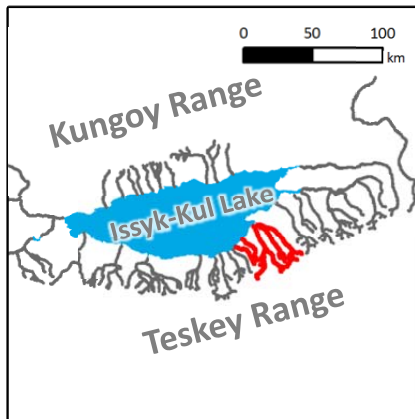
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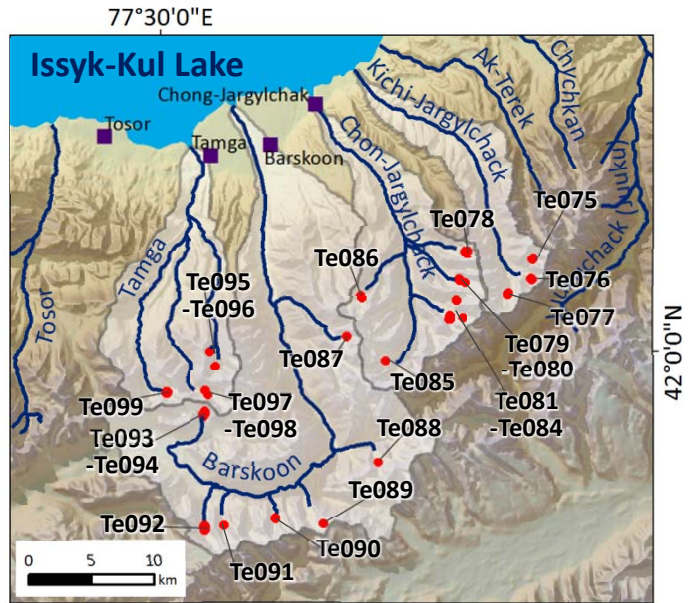
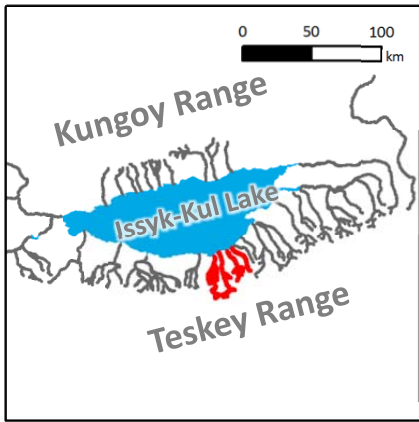
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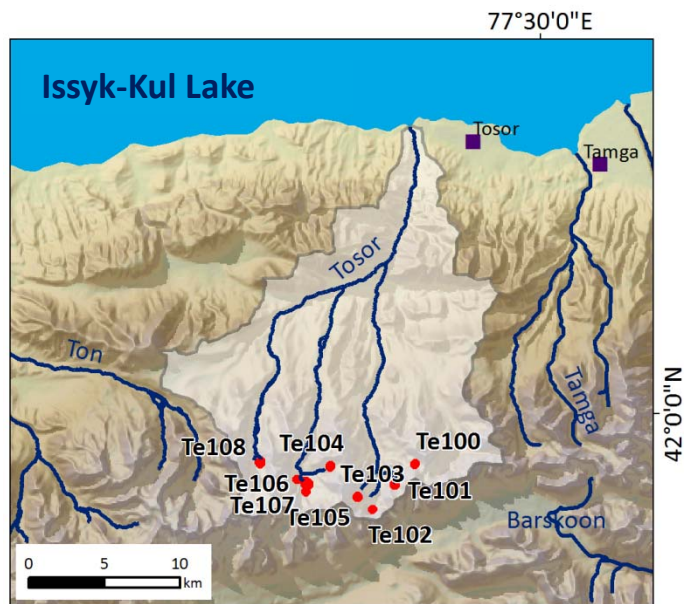
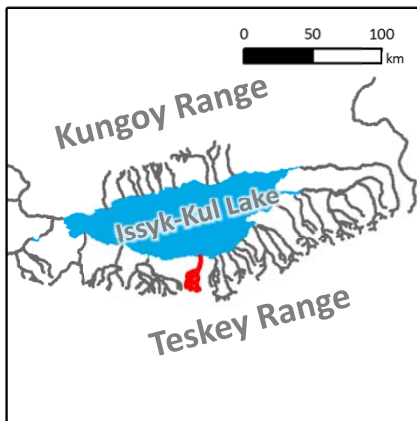
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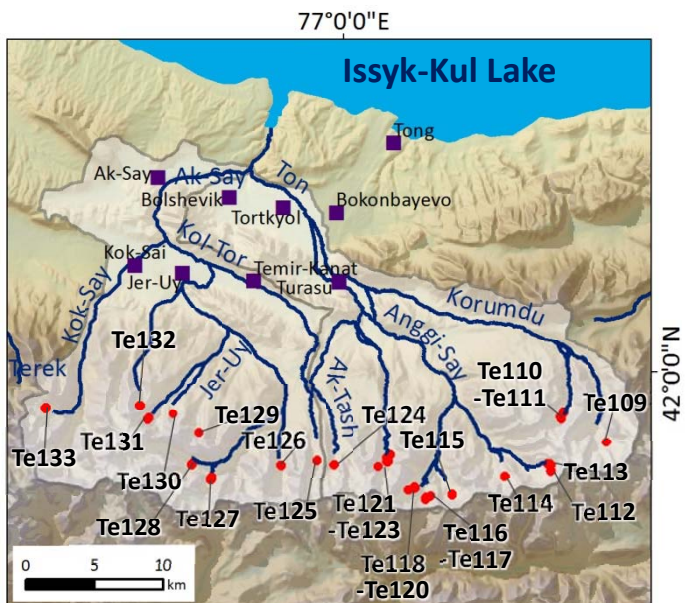
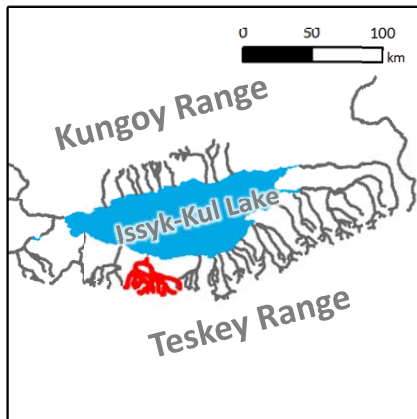
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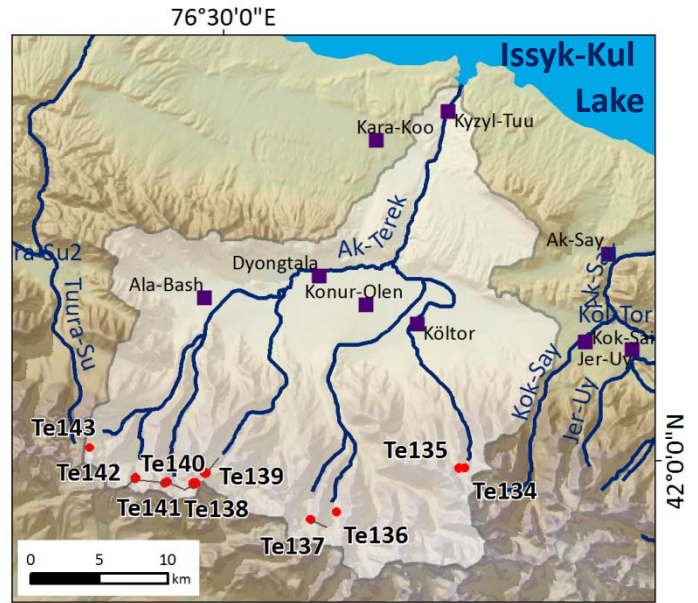
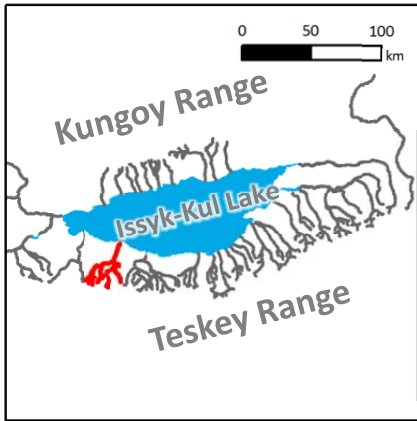


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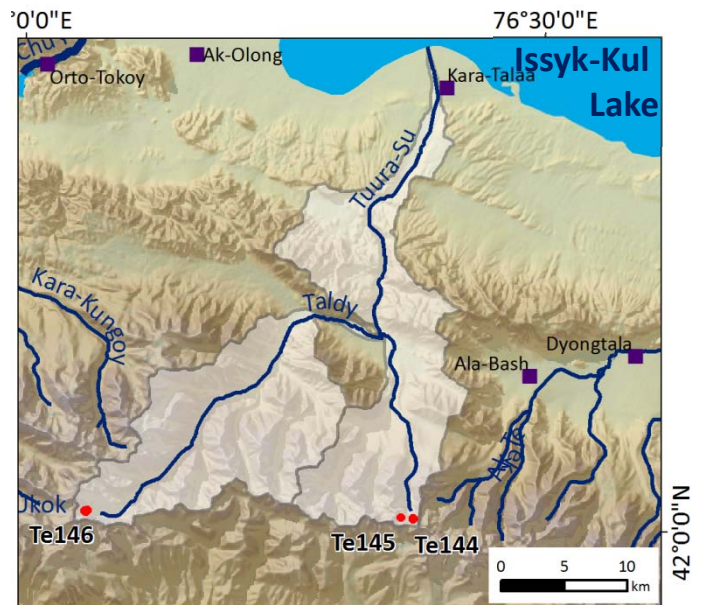
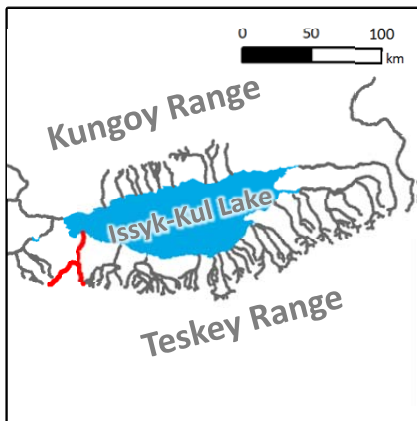
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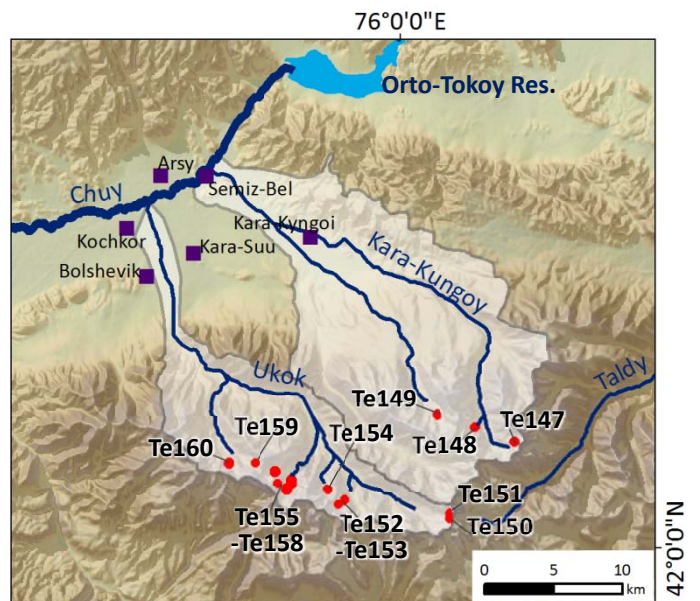
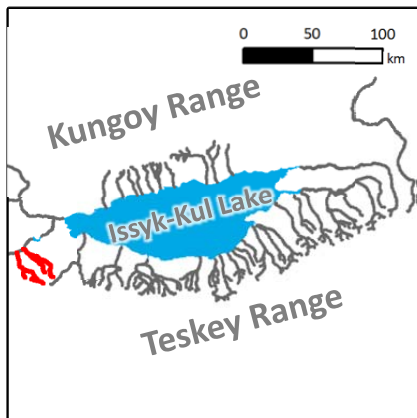
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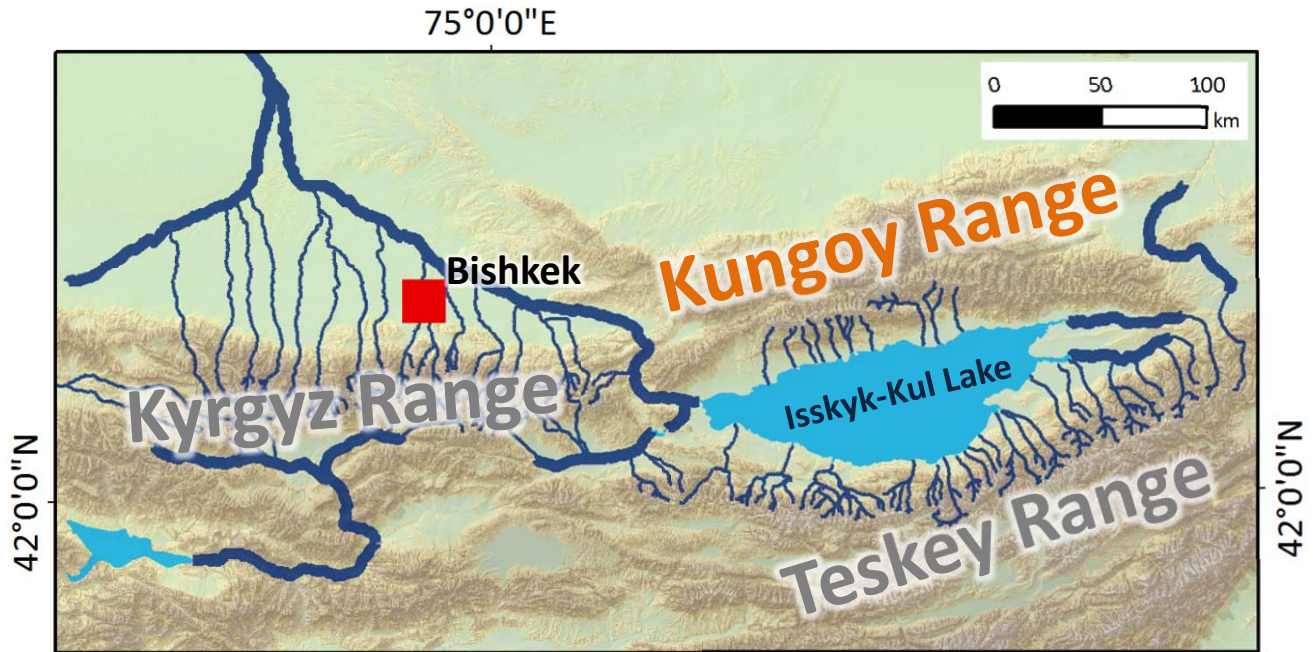


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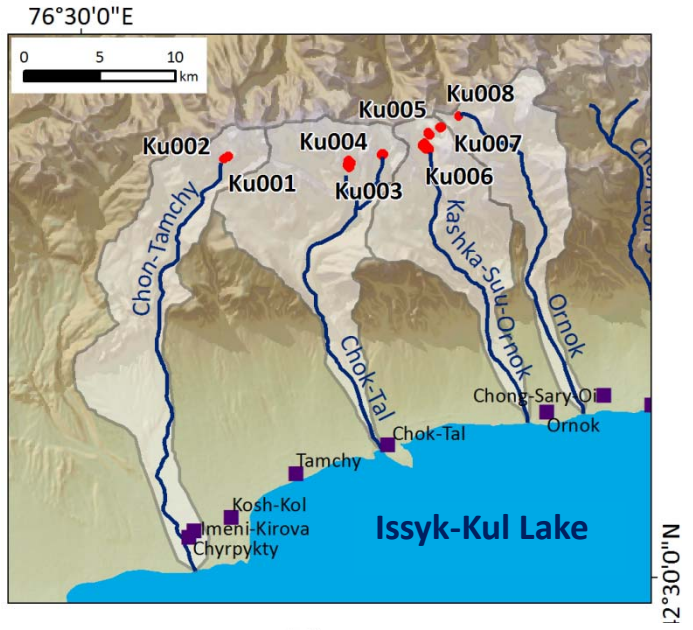
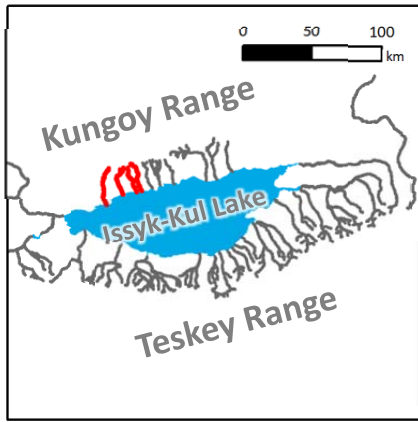
Kungoy Range



map ID	latitude	longitude	satellite	date	lake type	river basin	area	elevation
Ku001	42deg 45' 20.037" N	76deg 36' 58.634" E	Landsat8	20140822	moraine dammed lake(SDL)	Chon-Tamchy	0.008	3769
Ku002	42deg 45' 15.725" N	76deg 36' 47.153" E	Landsat8	20140822	moraine dammed lake(SDL)	Chon-Tamchy	0.006	3733
Ku003	42deg 44' 59.518" N	76deg 42' 49.861" E	Landsat8	20140822	moraine dammed lake(SDL)	Chok-Tal	0.083	3698
Ku004	42deg 45' 18.063" N	76deg 44' 27.589" E	Landsat8	20140822	moraine dammed lake	Chok-Tal	0.023	3786
Ku005	42deg 46' 00.456" N	76deg 46' 43.620" E	Landsat8	20140822	moraine dammed lake	Kashka-Suu-Ornok	0.017	3800
Ku006	42deg 45' 32.896" N	76deg 46' 33.567" E	Landsat8	20140822	moraine dammed lake(SDL)	Kashka-Suu-Ornok	0.104	3653
Ku007	42deg 46' 13.961" N	76deg 47' 18.883" E	Landsat8	20140822	moraine dammed lake(SDL)	Kashka-Suu-Ornok	0.008	3919
Ku008	42deg 46' 37.136" N	76deg 48' 11.277" E	Landsat8	20140822	moraine dammed lake(SDL)	Ornok	0.002	3830
Ku009	42deg 46' 49.818" N	76deg 53' 56.576" E	Landsat8	20140822	moraine dammed lake(SDL)	Chon-Koi-Suu	0.016	3660
Ku010	42deg 47' 27.496" N	76deg 57' 22.908" E	Landsat8	20140822	moraine dammed lake(SDL)	Chon-Koi-Suu	0.015	3921
Ku011	42deg 47' 25.359" N	76deg 57' 13.354" E	Landsat8	20140822	moraine dammed lake(SDL)	Chon-Koi-Suu	0.006	3907
Ku012	42deg 47' 54.332" N	76deg 58' 01.472" E	Landsat8	20140822	moraine dammed lake(SDL)	Cholpon-ata	0.003	3922
Ku013	42deg 48' 03.716" N	76deg 59' 59.740" E	Landsat8	20140822	moraine dammed lake(SDL)	Cholpon-ata	0.008	3941
Ku014	42deg 47' 21.558" N	77deg 00' 11.127" E	Landsat8	20140822	moraine dammed lake(SDL)	Cholpon-ata	0.007	3796
Ku015	42deg 47' 42.176" N	77deg 01' 09.949" E	Landsat8	20140822	moraine dammed lake(SDL)	Cholpon-Ata	0.002	3772
Ku016	42deg 48' 11.833" N	77deg 01' 55.840" E	Landsat8	20140822	moraine dammed lake	Cholpon-Ata	0.007	3851
Ku017	42deg 48' 08.236" N	77deg 02' 10.429" E	Landsat8	20140822	moraine dammed lake	Cholpon-Ata	0.021	3839
Ku018	42deg 47' 48.682" N	77deg 02' 02.880" E	Landsat8	20140822	moraine dammed lake(SDL)	Cholpon-Ata	0.017	3720
Ku019	42deg 47' 42.334" N	77deg 02' 24.092" E	Landsat8	20140822	moraine dammed lake(SDL)	Cholpon-Ata	0.008	3711
Ku020	42deg 47' 42.204" N	77deg 03' 41.196" E	Landsat8	20140822	moraine dammed lake(SDL)	Kashka-Suu	0.001	3760
Ku021	42deg 48' 06.714" N	77deg 06' 14.937" E	Landsat8	20140822	moraine dammed lake(SDL)	Orto-Dolon-Ata	0.002	3731
Ku022	42deg 47' 56.052" N	77deg 06' 15.194" E	Landsat8	20140822	moraine dammed lake(SDL)	Orto-Dolon-Ata	0.002	3739
Ku023	42deg 48' 02.705" N	77deg 06' 32.948" E	Landsat8	20140822	moraine dammed lake(SDL)	Orto-Dolon-Ata	0.001	3687
Ku024	42deg 47' 55.418" N	77deg 06' 31.017" E	Landsat8	20140822	moraine dammed lake(SDL)	Orto-Dolon-Ata	0.010	3674
Ku025	42deg 48' 16.574" N	77deg 15' 53.786" E	Landsat8	20140822	moraine dammed lake	Chon-Aksu	0.005	3667
Ku026	42deg 48' 43.326" N	77deg 13' 33.187" E	Landsat8	20140822	moraine dammed lake(SDL)	Chon-Aksu	0.008	3672
Ku027	42deg 49' 07.719" N	77deg 12' 06.991" E	Landsat8	20140822	moraine dammed lake(SDL)	Chon-Aksu	0.003	3551
Ku028	42deg 49' 14.009" N	77deg 12' 06.419" E	Landsat8	20140822	moraine dammed lake(SDL)	Chon-Aksu	0.006	3545
Ku029	42deg 48' 50.889" N	77deg 09' 50.876" E	Landsat8	20140822	moraine dammed lake(SDL)	Chon-Aksu	0.002	3800
Ku030	42deg 48' 55.246" N	77deg 08' 43.146" E	Landsat8	20140822	moraine dammed lake(SDL)	Chon-Aksu	0.005	3693
Ku031	42deg 49' 21.938" N	77deg 09' 19.185" E	Landsat8	20140822	moraine dammed lake(SDL)	Chon-Aksu	0.016	3524
Ku032	42deg 49' 28.121" N	77deg 08' 34.620" E	Landsat8	20140822	moraine dammed lake(SDL)	Chon-Aksu	0.015	3647
Ku033	42deg 52' 24.843" N	77deg 14' 22.820" E	Landsat8	20140822	moraine dammed lake(SDL)	Chon-Aksu	0.002	3747
Ku034	42deg 53' 38.278" N	77deg 18' 02.876" E	Landsat8	20140822	moraine dammed lake(SDL)	Chon-Aksu	0.004	3797
Ku035	42deg 56' 02.011" N	77deg 32' 52.925" E	Landsat8	20140822	moraine dammed lake	Ak-Suu (Jelkaragai)	0.011	3778
Ku036	42deg 54' 20.803" N	77deg 34' 42.797" E	Landsat8	20140822	moraine dammed lake	Sut-Bulak	0.003	3660
Ku037	42deg 54' 21.938" N	77deg 39' 57.429" E	Landsat8	20140822	moraine dammed lake(SDL)	Chet-Baisorun	0.003	3677
Ku038	42deg 54' 35.005" N	77deg 40' 31.881" E	Landsat8	20140822	moraine dammed lake(SDL)	Chet-Baisorun	0.002	3677

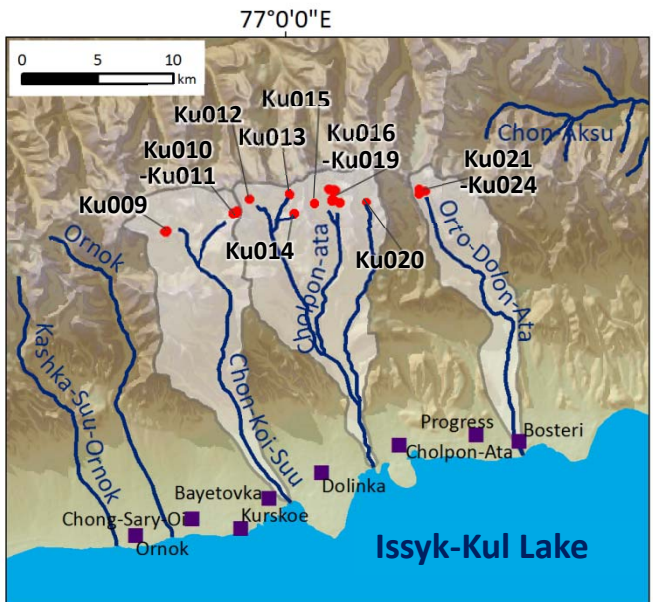
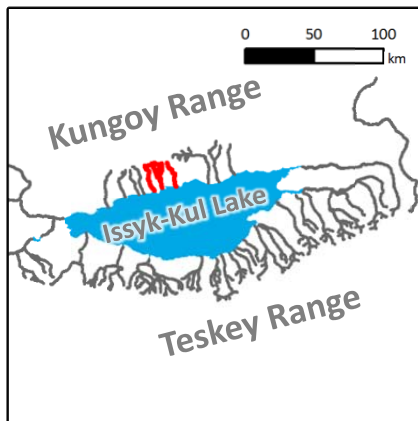
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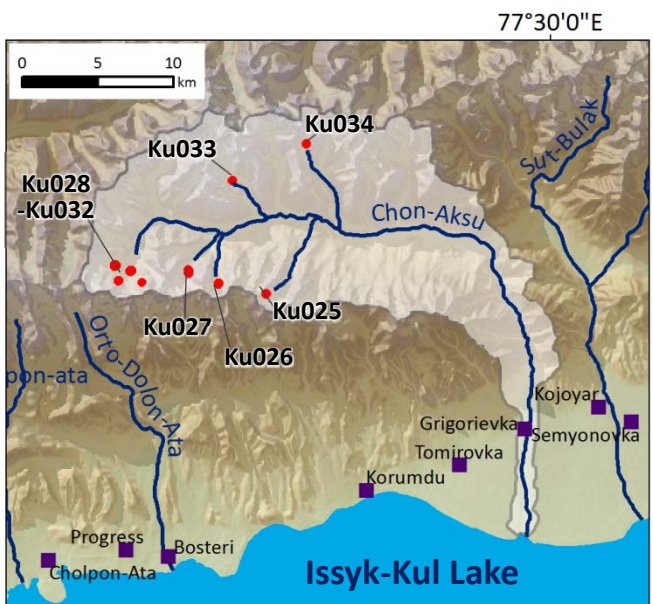
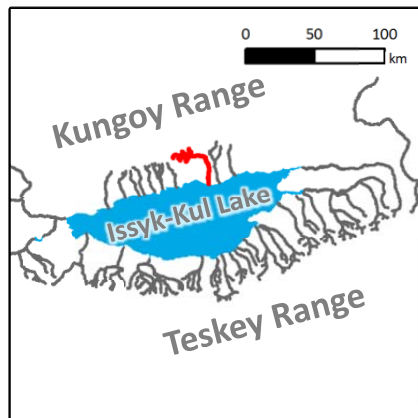
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Ku035-038

