

Asia-Pacific Mercury Monitoring Network
Workshop, June20-23,2015

MERCURY SITUATION IN MONGOLIA

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Structure of Presentation

1. Mongolia
2. Mercury in cities
 - Smoke (Coal burning, used car and ger's stove)
 - Waste and recycling (burning)
3. Illegal (hidden) usage mercury for amalgamation (close to Small scale gold mining sites)
 - North Mongolia
 - South Mongolia
4. **Mercury dispersal by wind**
5. Mercury inputs to society
6. **Mercury in human hair**
7. Mercury awareness training
8. What we are planning to do

Mongolia is landlocked country between Russia and China

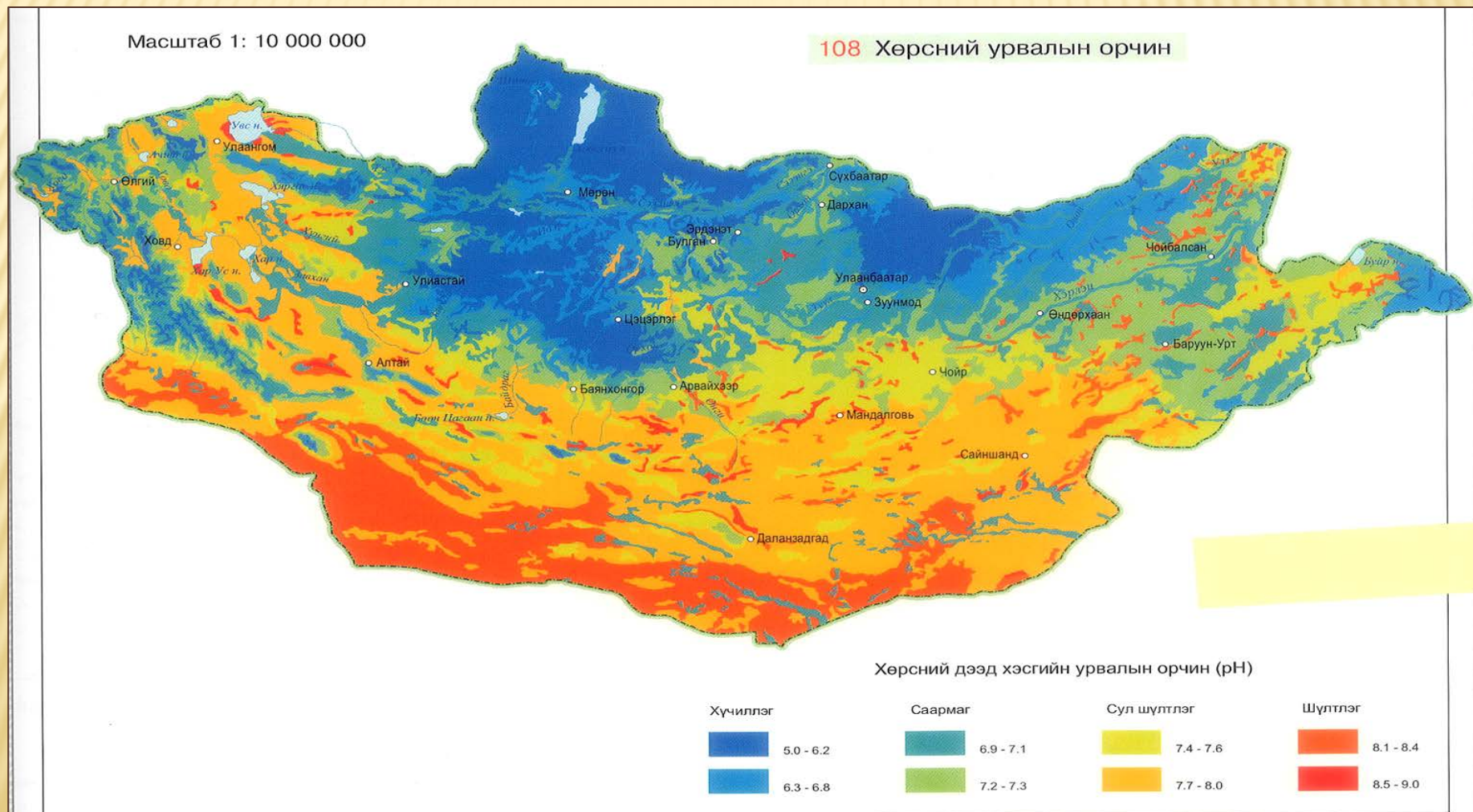
(Territory 4 times bigger than Japan and population 40 times smaller)



Half population (1,5 mln.) of Mongolian are Nomads



Mongolia has continental and contrast climate



North Mongolia



South Mongolia



	North Mongolian forest -steppe area	South Mongolian Gobi area
Number of days with temperature above zero on the ground surface	170-190 days	230-250 days (surface soil is heated up to 60 ⁰ -65 ⁰ C or more)
Average wind speed per month	2, 2 meter per sec	3, 7 – 4, 0 meter per sec
Average Humidity	50-60%	14-18%
Average monthly precipitation	30-40 mm	3,0-3,9 mm
Yellow dust transportation	Not known	by wind (sometime up to 30-40 m/sec)

CAPITAL ULAANBAATAR IN WINTER

COAL BURNING SMOKE (LIGNITE FROM BAGANUUR DEPOSIT)

About 3,3 mln.ton of coal is burned in year
2014



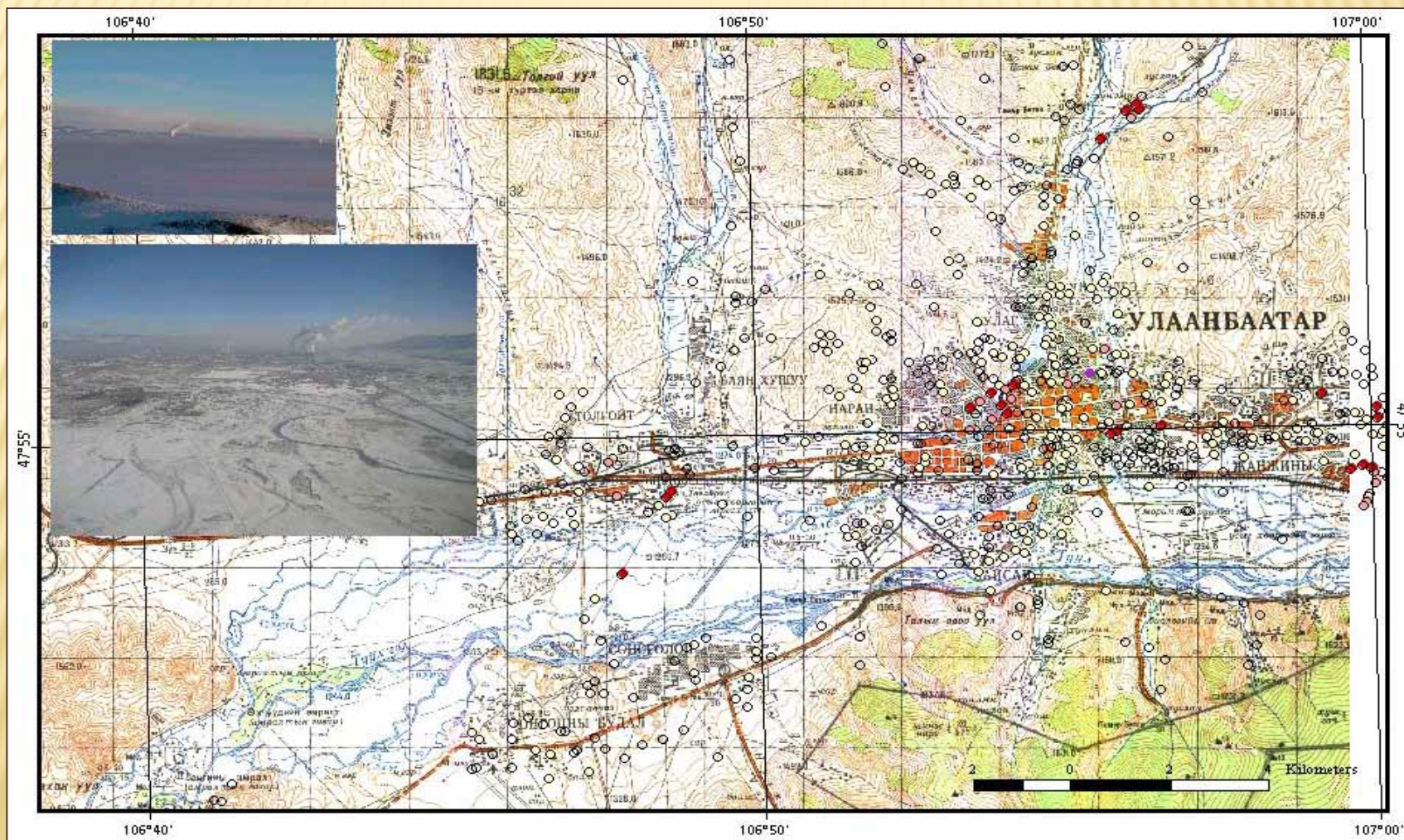
Photo by B.Tumenbayar

Mercury content in Coal

Coal Deposits	Mercury content in coal	Burned coal and mercury
Tavantolgoi	0.1 ppm	3,3 mln. ton in Ulaanbaatar (759kg Hg/year)
Baganuur	0.23 ppm	
Nalaikh	0.16 ppm	

Some result of Mercury anomaly in Ulaanbaatar (winter snow sampling)

Map presented by Dr. Tseveen ,2002.
(Institute of Physics and Techniques, Mongolian Academy of Sciences)



NORTH MONGOLIA, MERCURY RELATED WITH GOLD MINING ACTIVITY IN SOIL, SOUM CENTER (DATA FROM 2003)

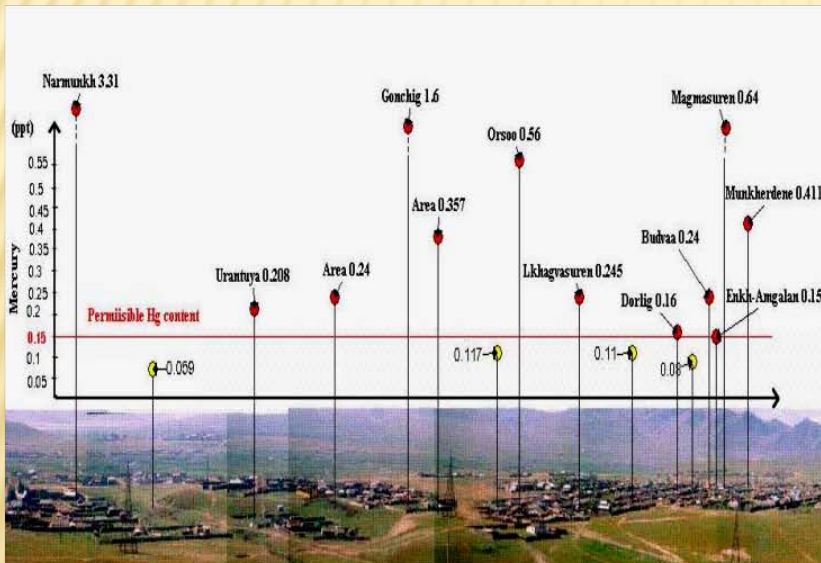
Mandal bag



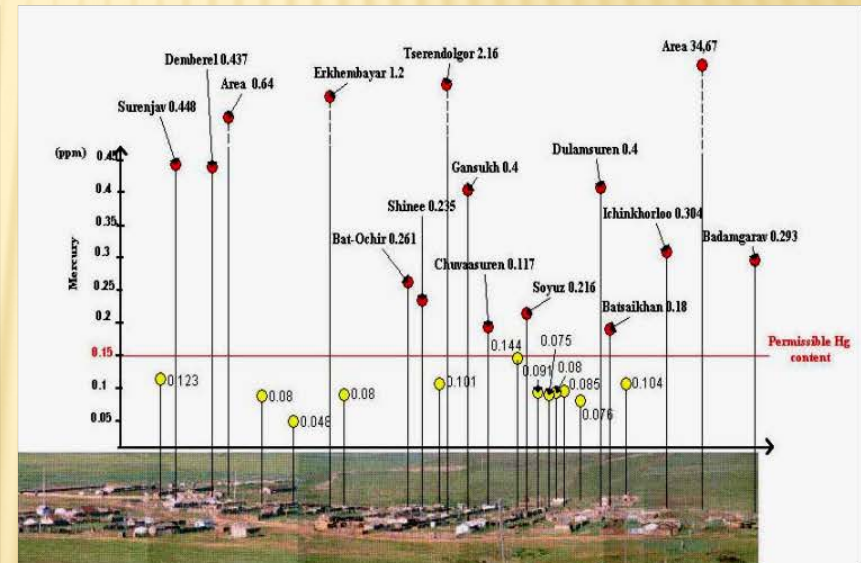
Bichiet district



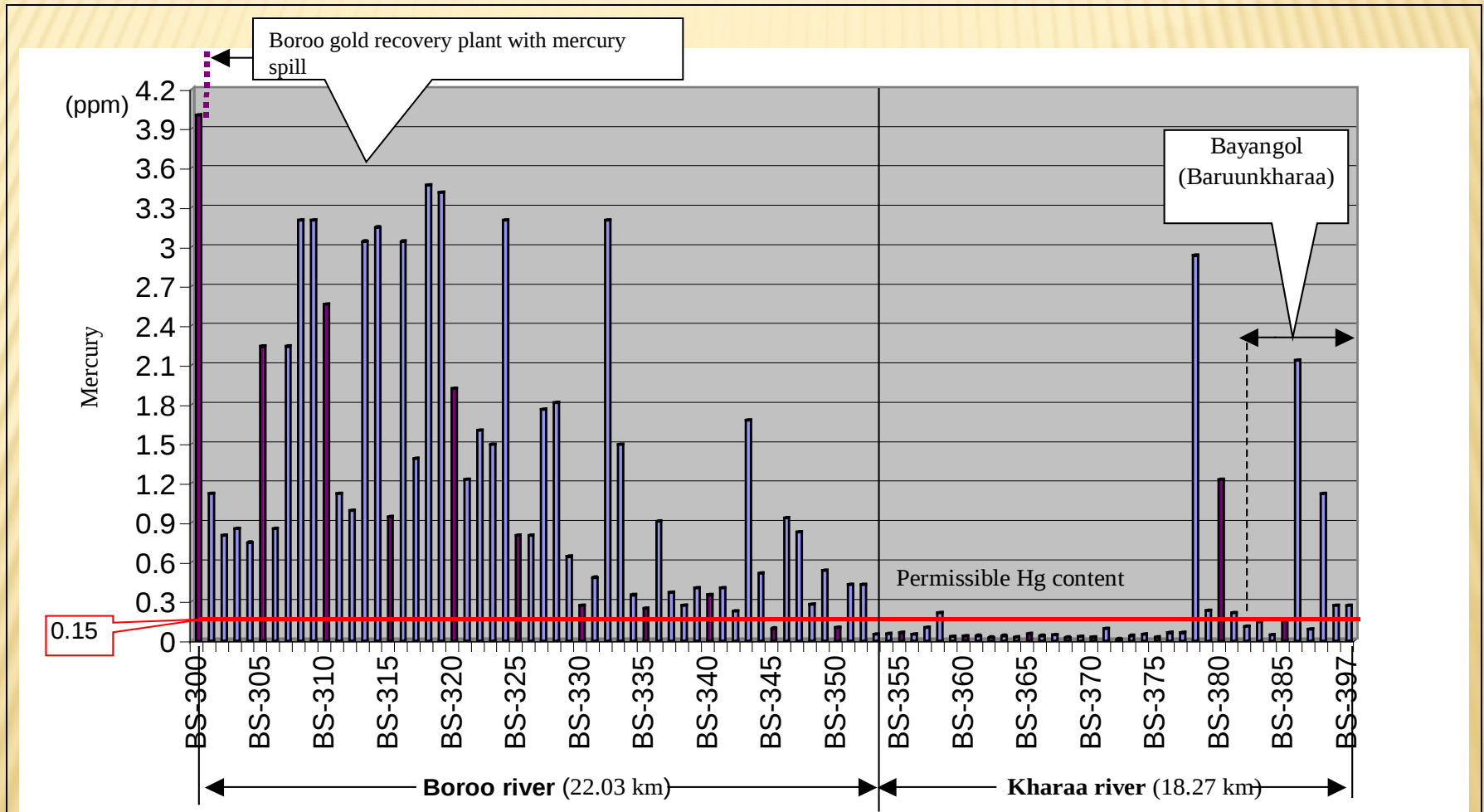
Mandal bag



Bichiet district

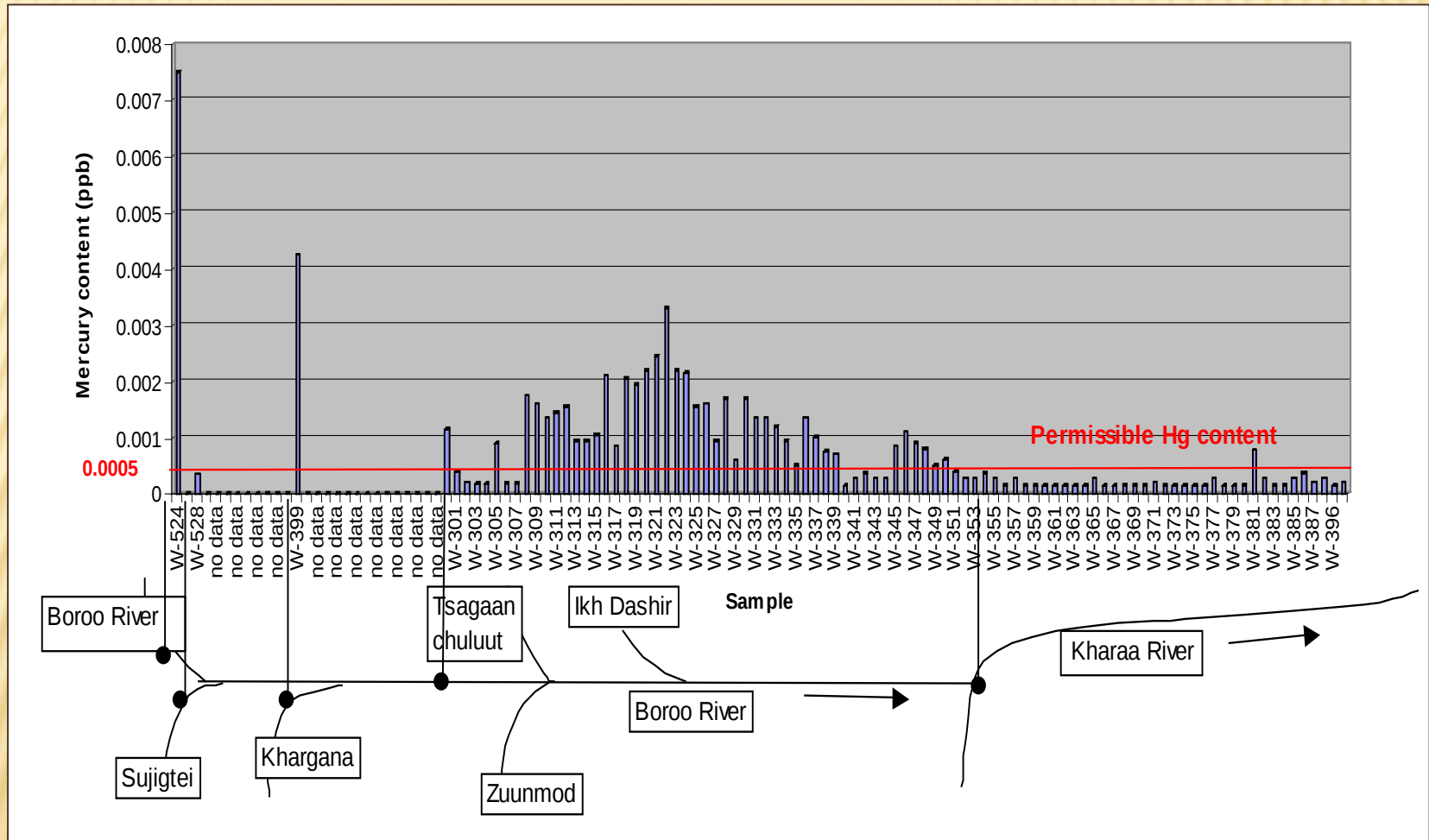


NORTH MONGOLIA. MERCURY CONTENT IN BOTTOM SEDIMENTS OF THE BOROO AND KHARAA RIVERS (96 SAMPLES , DATA 2002)



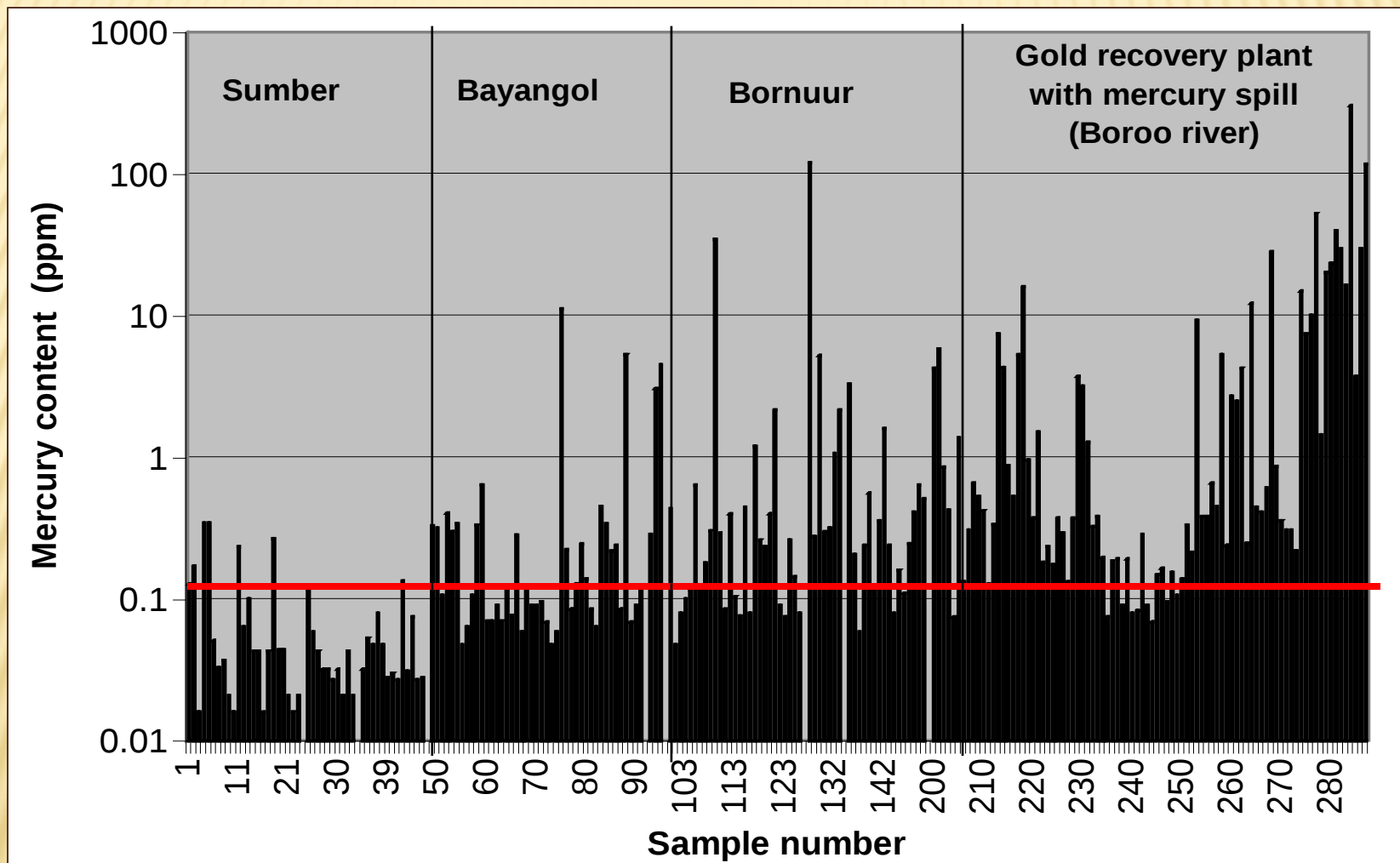
* Permissible content is Japanese standard

MERCURY CONTENT OF RIVER WATER (2002)



MERCURY CONTENT OF SOIL (233 SAMPLES)

NOTE: VERTICAL SCALE IS LOGARITHMIC (DATA ANALYZED IN 2002)



Animals were watered from the mercury polluted Boroo river and small-scale mining activity.



South Mongolia. Common view of Mercury Waste in South Gobi (GPS #672).

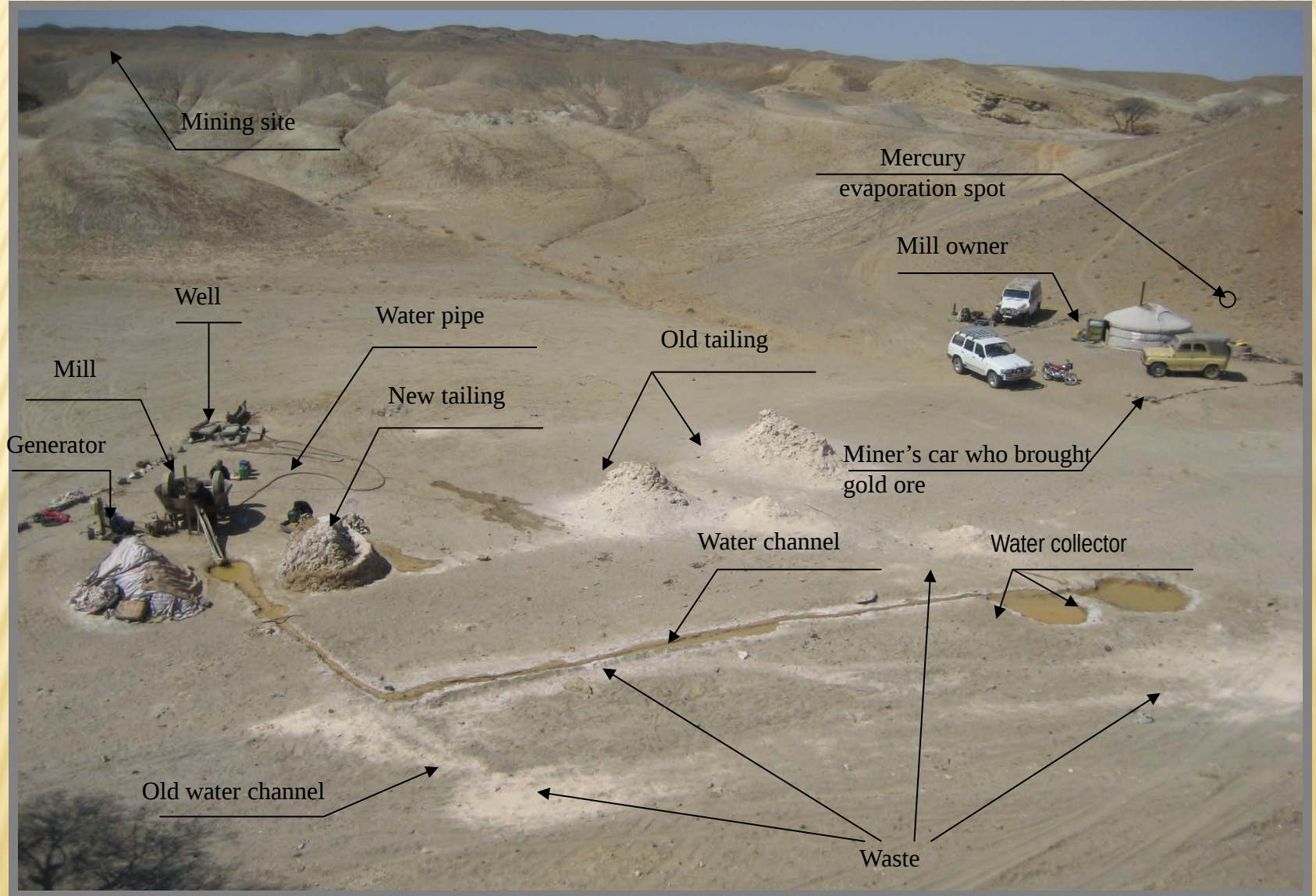
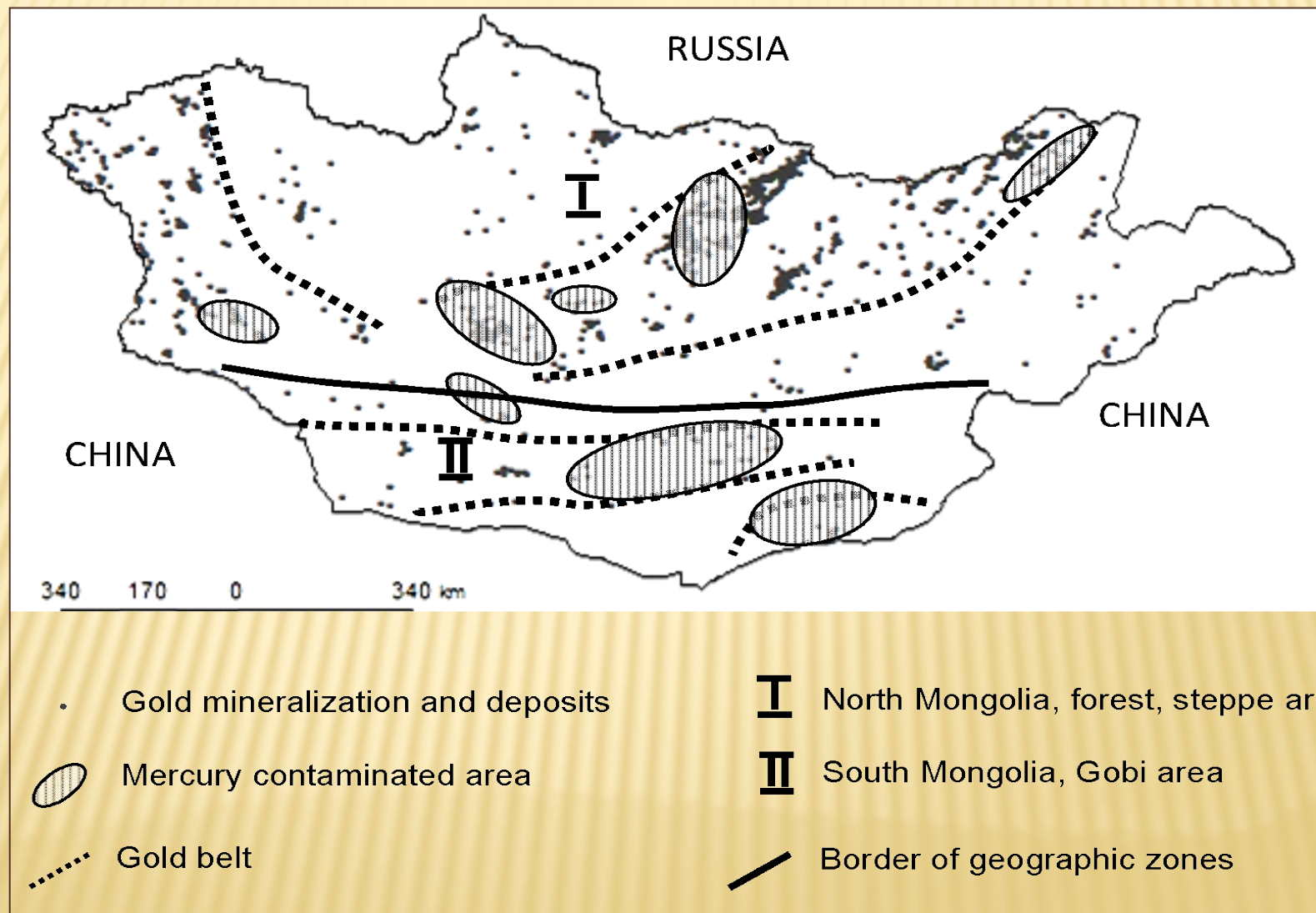
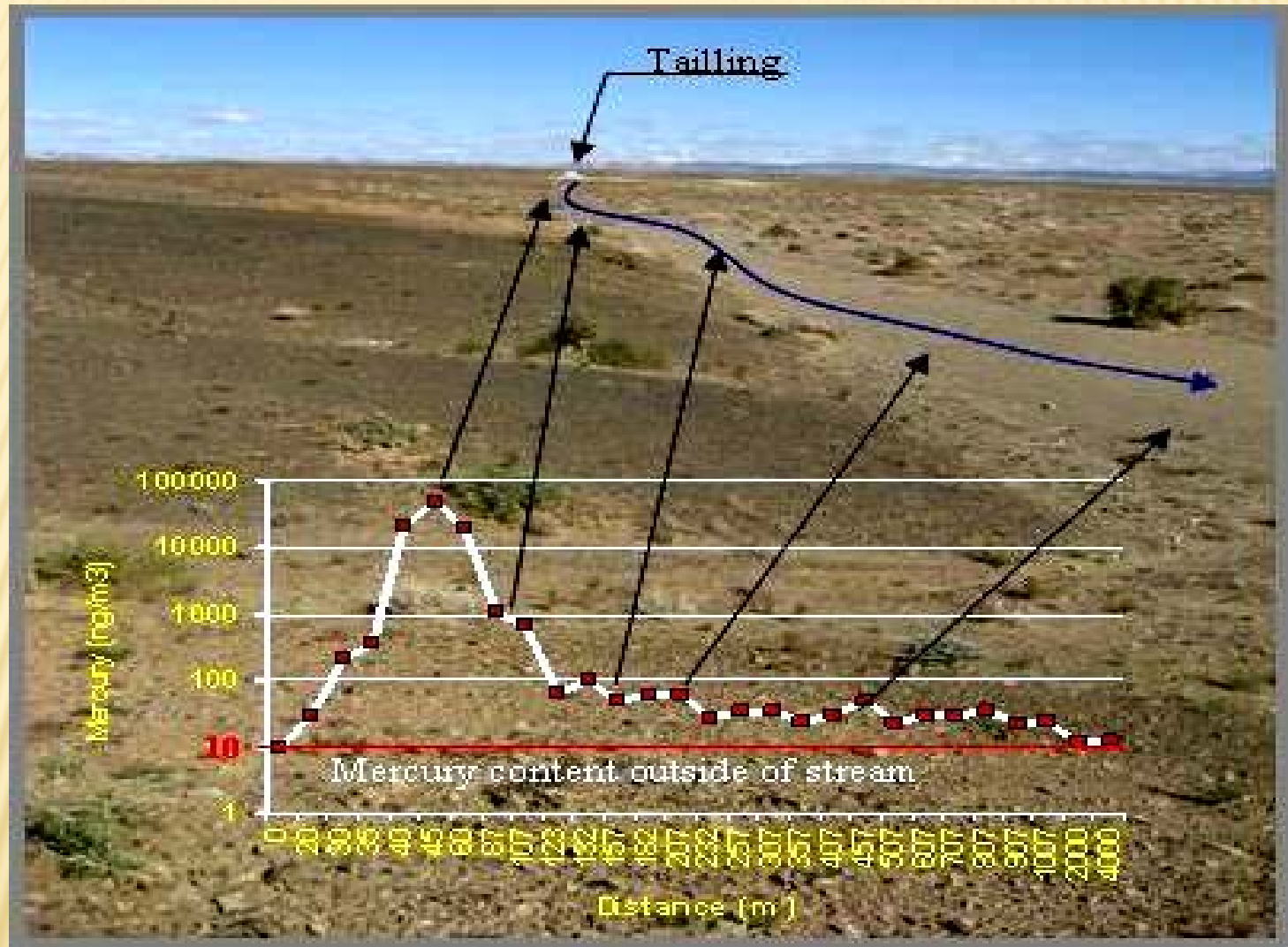


Photo taken in 2006

Mercury Contaminated Sites and Gold Distribution



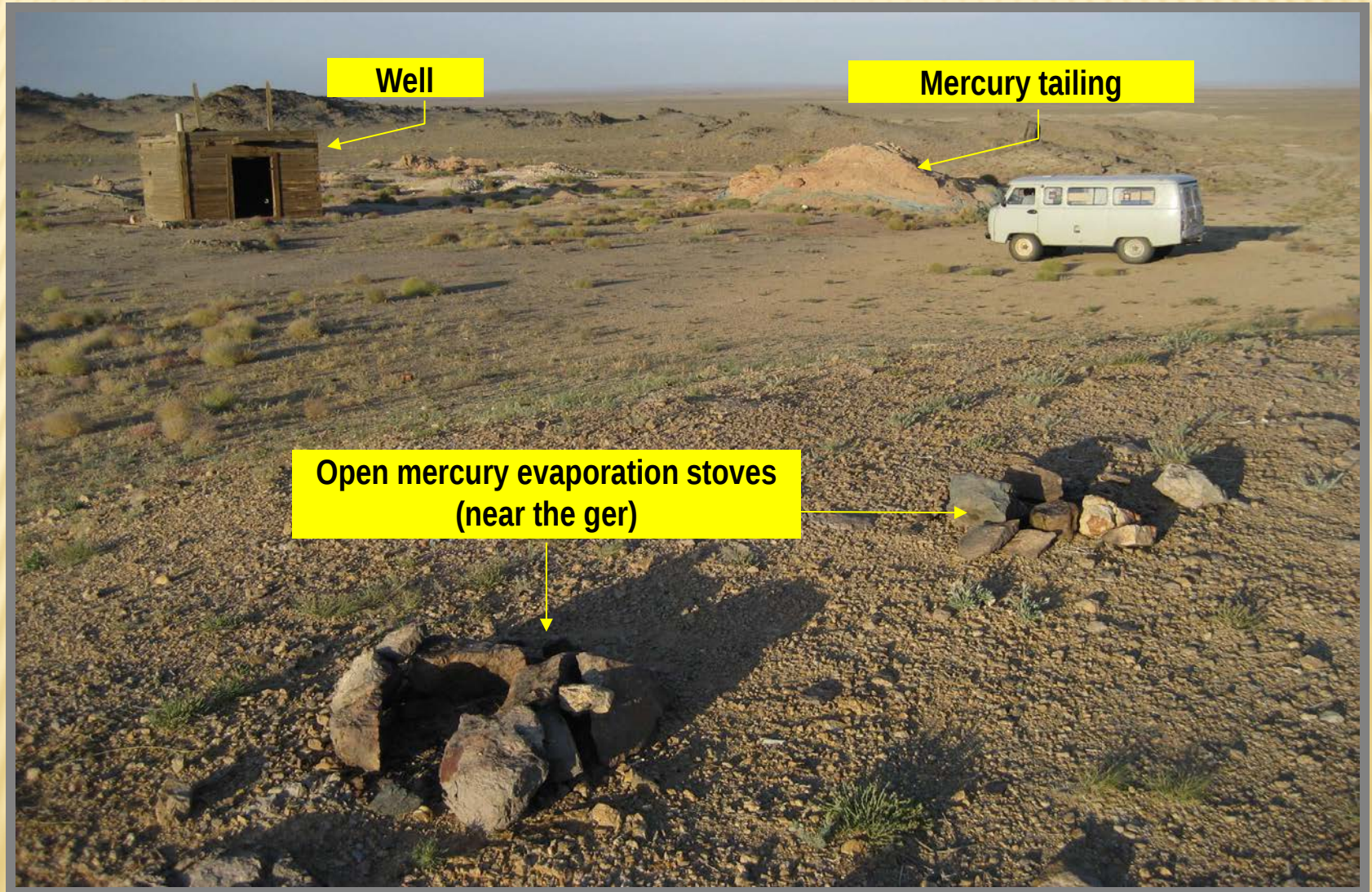
Mercury transport along stream bed



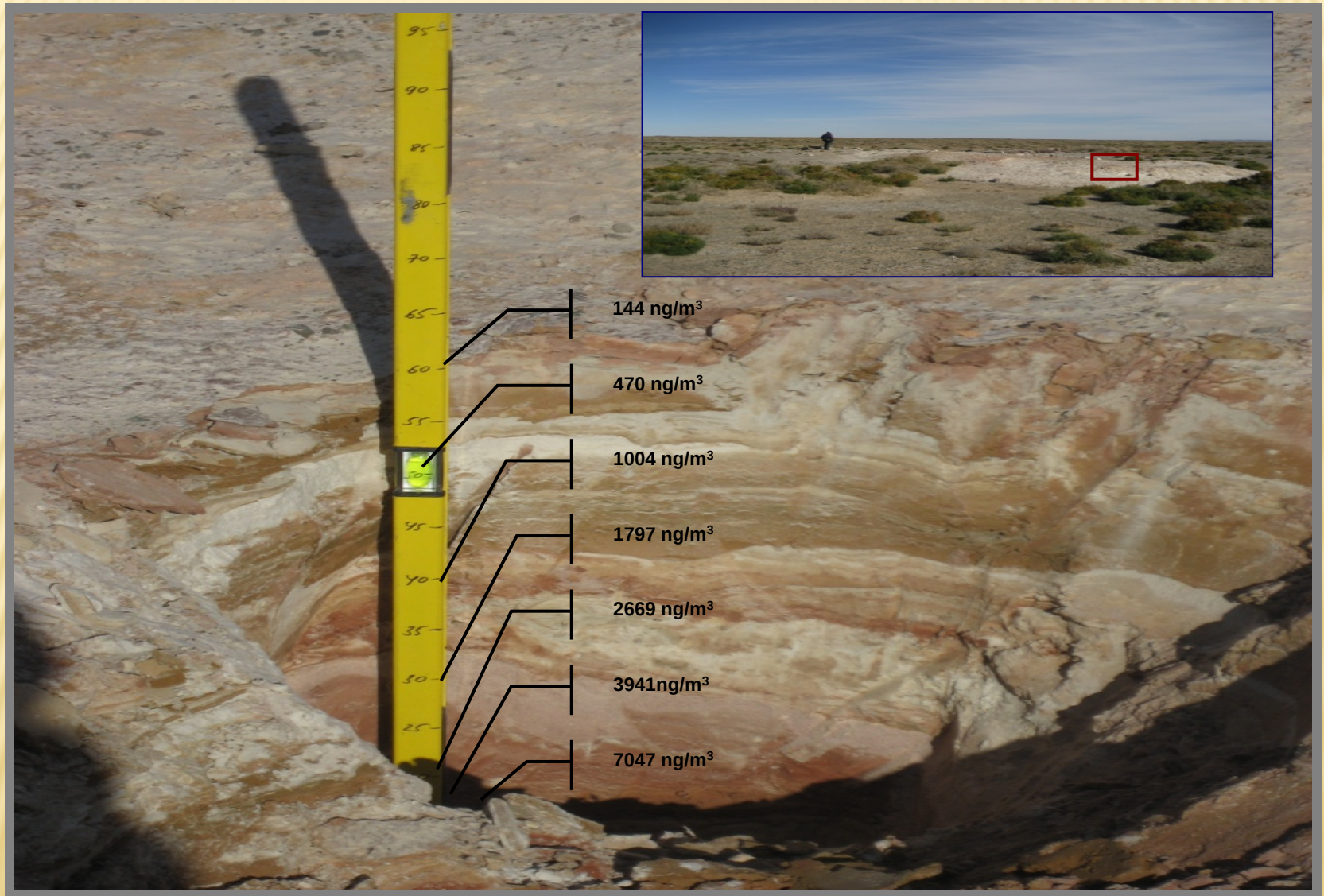
Measurements by Lumex inside test holes immediately after digging. Shar Khond, Shinejinst, Bayankhongor Aimag. (GPS 754)

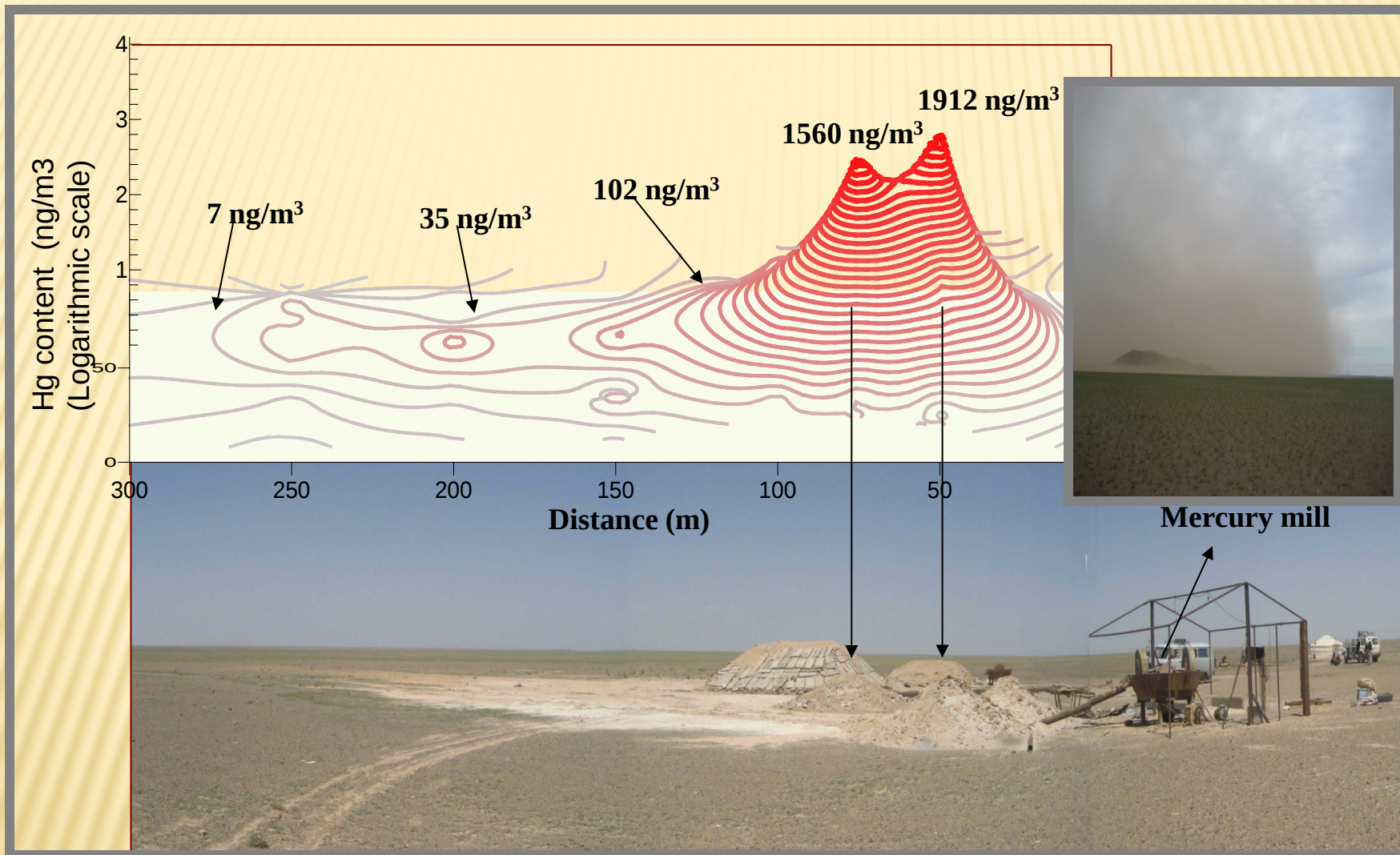
Abandoned mercury tailings and open evaporation stoves (2006)

Khanin Khets, Mandal-Ovoo, South Gobi Aimag (GPS 683)



Amount of evaporated mercury from the tailings





Transport of mercury by wind, as measured by Lumex Hg detector held 5–10 cm above the ground surface to detect mercury vapour. Khuzuu toirom, Noyon, South Gobi Aimag, (GPS 461.)

Mercury dispersal by wind

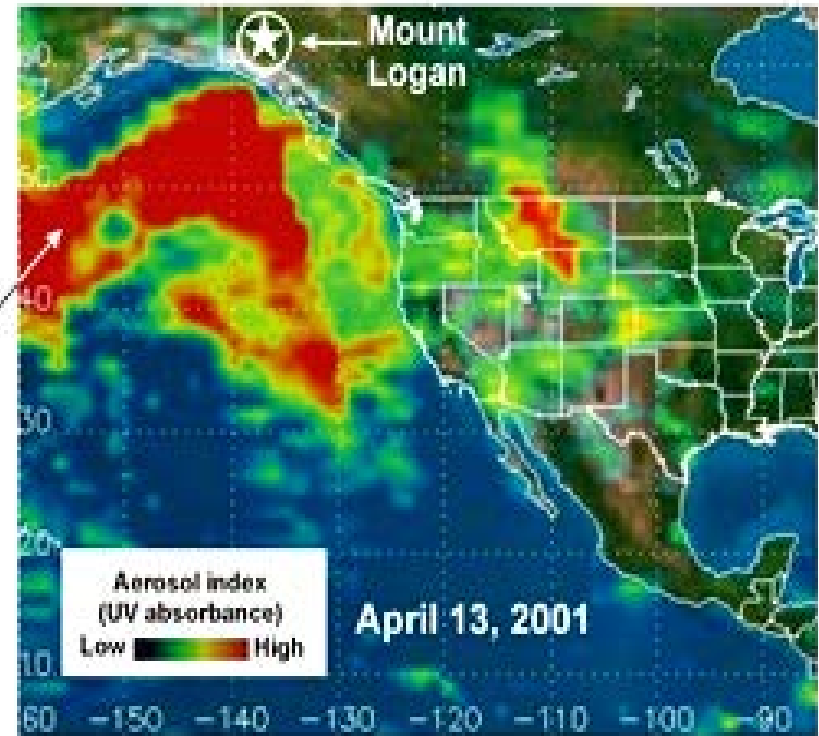
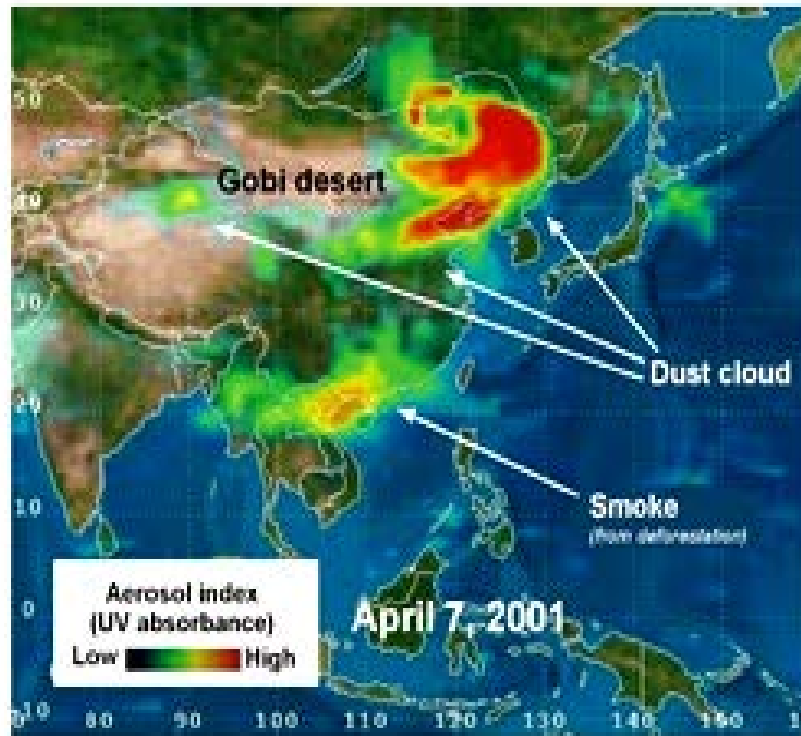
The Gobi Desert is infamous for its strong winds, especially between February and May, than between October and December.



*Strong wind can transport dust across a wide area.
Ulziit, Mandalgobi Aimag.*



Gobi Desert dust



Gobi Desert dust

Photo © Natural Resources
Canada

MERCURY INPUTS TO SOCIETY

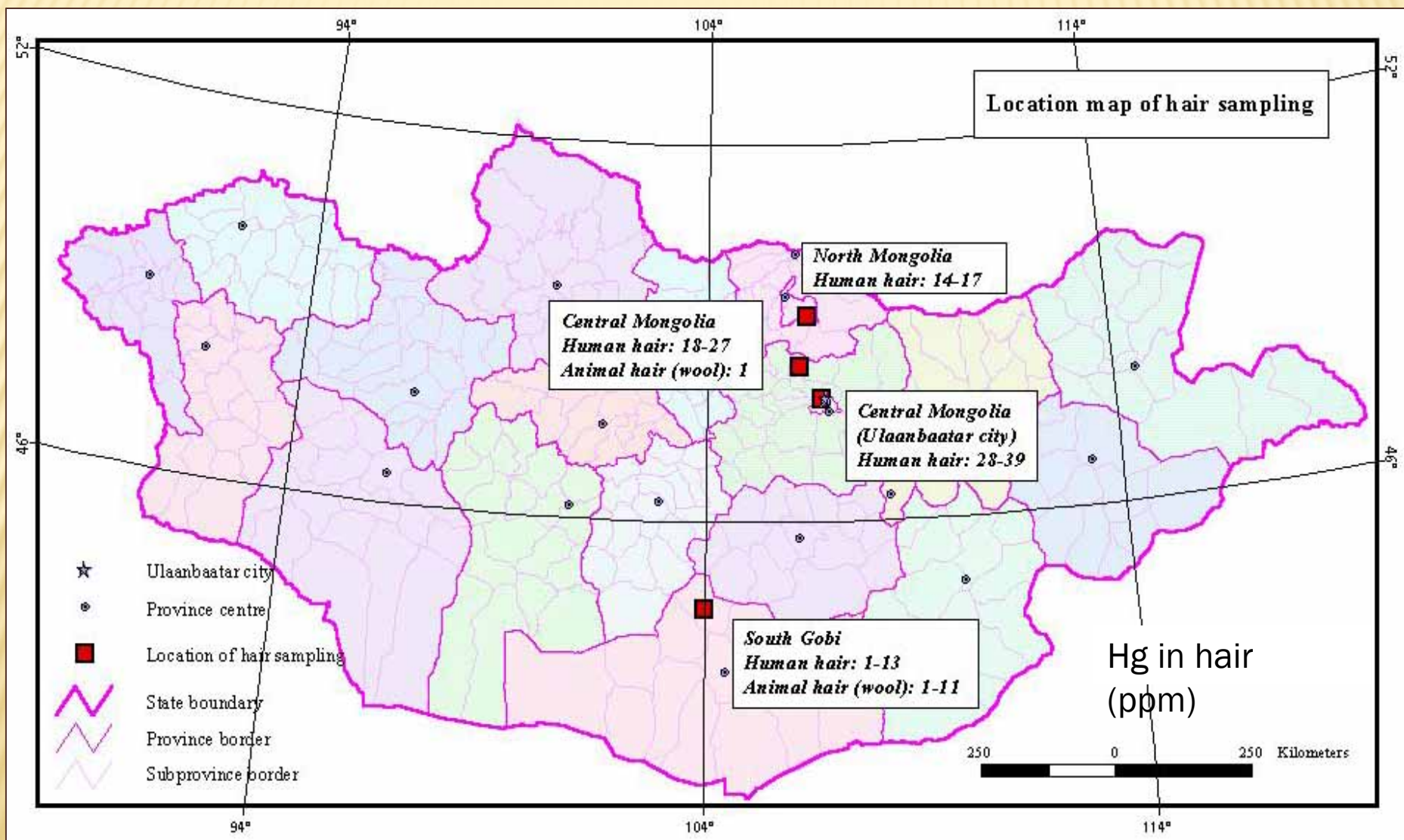
Source: Dr. Jargalsaikhan and other (2011)MNE. Inventory of Hg releases in Mongolia

Source category	Estimated Hg input, Kg Hg/y
Energy consumption (Coal uses, biomass etc.)	1786
Primary metal production (gold extraction, production of Cu from concentrate)	542197
Use and disposal of products with mercury content (Dental,Thermometer etc.)	1237
Waste deposition/land filling and waste water treatment	4559
other...	
TOTAL of quantified inputs	about 548,410

Mercury inputs to society should be understood here as the mercury amounts made available for potential releases through economic activity in the country

MERCURY SOURCES

- **Illegal import of metallic Mercury**
(for Small Scale Gold mining activity, amalgamation)
- **Coal burning, used car**
(coal combustion of large power plants and gers)
- **Waste**
(batteries, lamps, thermometers etc.)
- **Placer Mercury mine**
(from the Bottom of River)
- **Others**
(cement, Metal factory etc.)



MERCURY IN HAIR OF GOLD MINERS



TOTAL MERCURY IN HUMAN HAIR (MONGOLIA)*

	Sample	T-Hg (ppm)	Me-Hg (ppm)
1	Citizen (15)	0,11	-
2	Nomads** (16)	0,32	-
3	Gold miner (5)	0,84	-
4	Gold buyer (1)	2,47	-
5	Fisher (1)	0,89	0,40
6	Average*** (38)	0,90	0,12 (?)
7	Animal ****(12)	0,01	-

* Analyzed by Dr.Tumenbayar in NIMD lab. With help Dr. M.Sakamoto and Dr. S.Honda

** Part time Nomad-miners included (about 1month/year active in gold mine)

*** Average for Mongolia (Included gold miners)

**** Animal for meal (goat, camel, sheep and Cow)

MERCURY AWARENESS



Mercury being driven off as invisible toxic Hg vapour by heating the Au Hg amalgam.

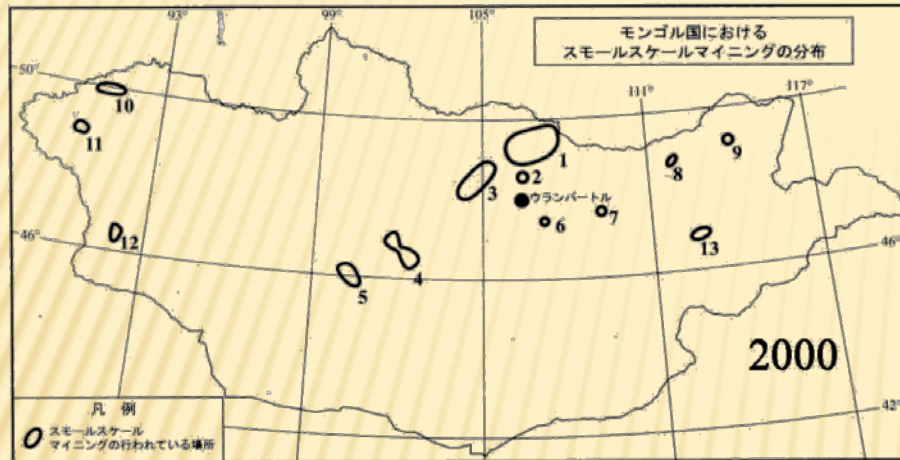


Metallic mercury in direct contact with unprotected bare skin of hands.

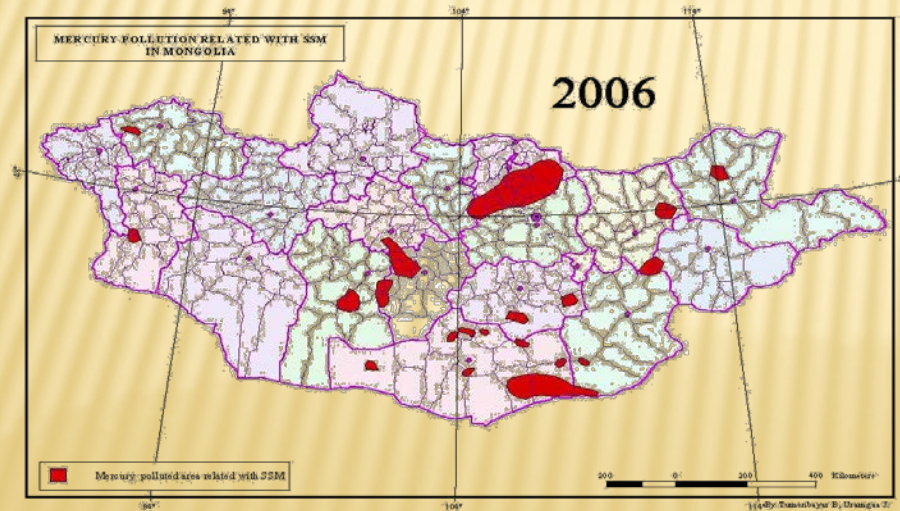


Mercury awareness training in Sevrey soum, Aimag. LEFT - school teachers, RIGHT -Soum Governor, officials and environmental inspectors, FRONT - the schoolchildren.

Mercury polluted locations



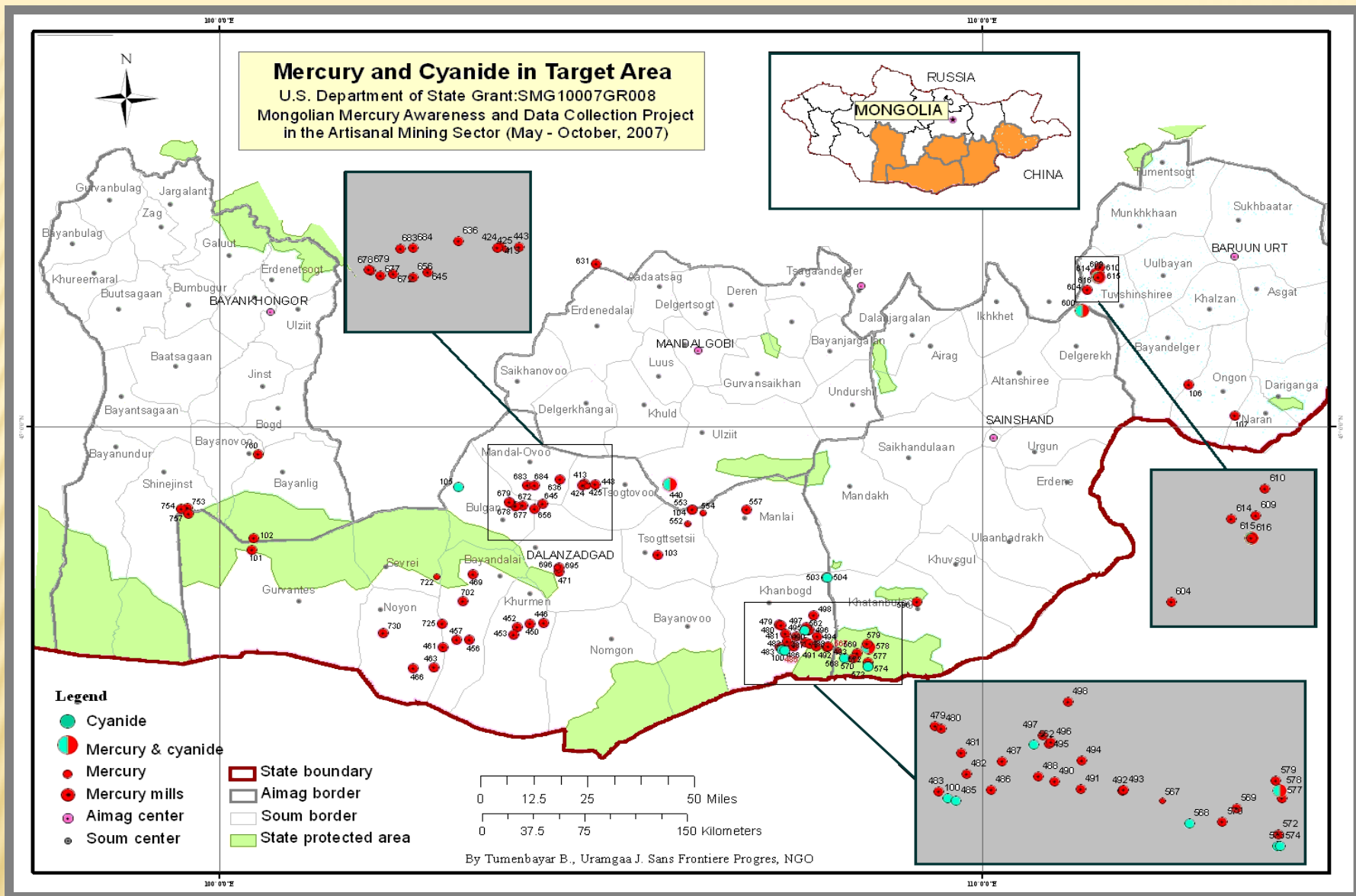
- In **1996** Mercury polluted area was **1 spot** in the North Mongolia
- In **2000** It is increased up to 13 spots



- In **2006** Mercury polluted area about 128 spots.



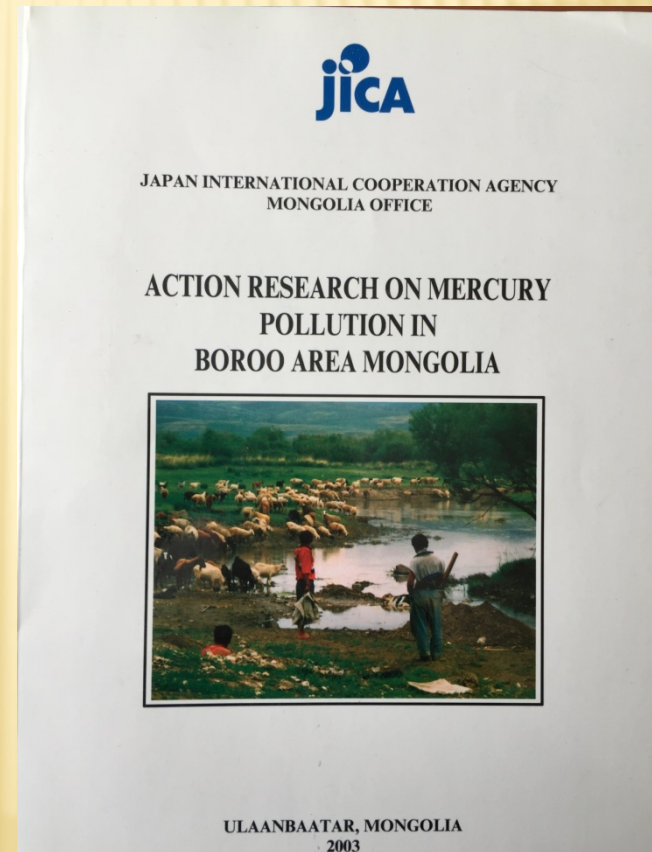
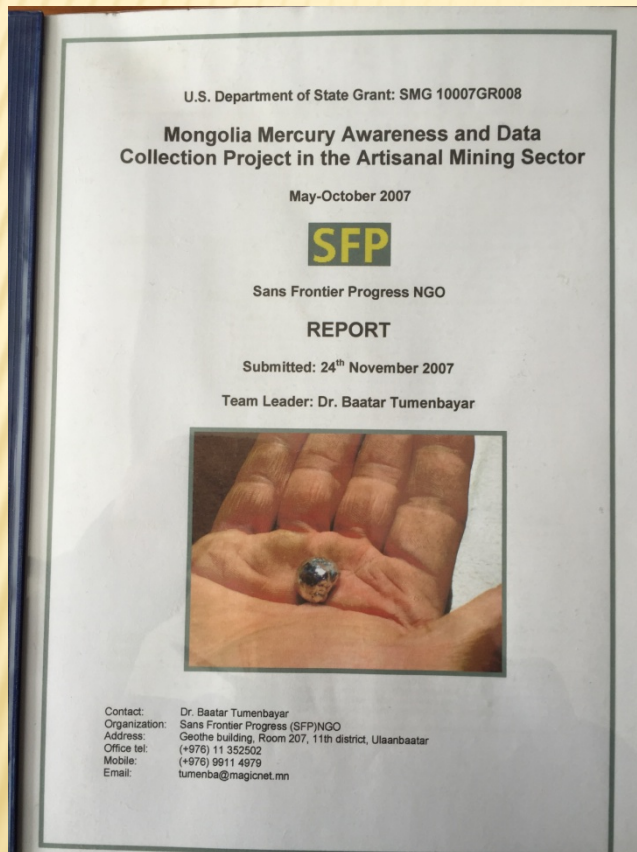
MAP OF MERCURY POLLUTED SITES IN MONGOLIA
(Mercury pollution related with hard rock gold mine (red spots)
and placer gold mine (Yellow spots))



Distribution of mercury and cyanide sites visited during the SFP survey.

**THANK YOU
FOR YOUR ATTENTION**

WE IMPLEMENTED 14 MERCURY PROJECTS





A group of four raised plastic-lined vats for cyanide leaching of gold-bearing tailings that are also mercury-bearing. In the middle is the sump into which gold leachate is routed by gravity via a set of plastic pipes. Dornogobi Aimag.(2006,