Gull i øret og Arsen i håret

Åsgeir Rossebø Almås

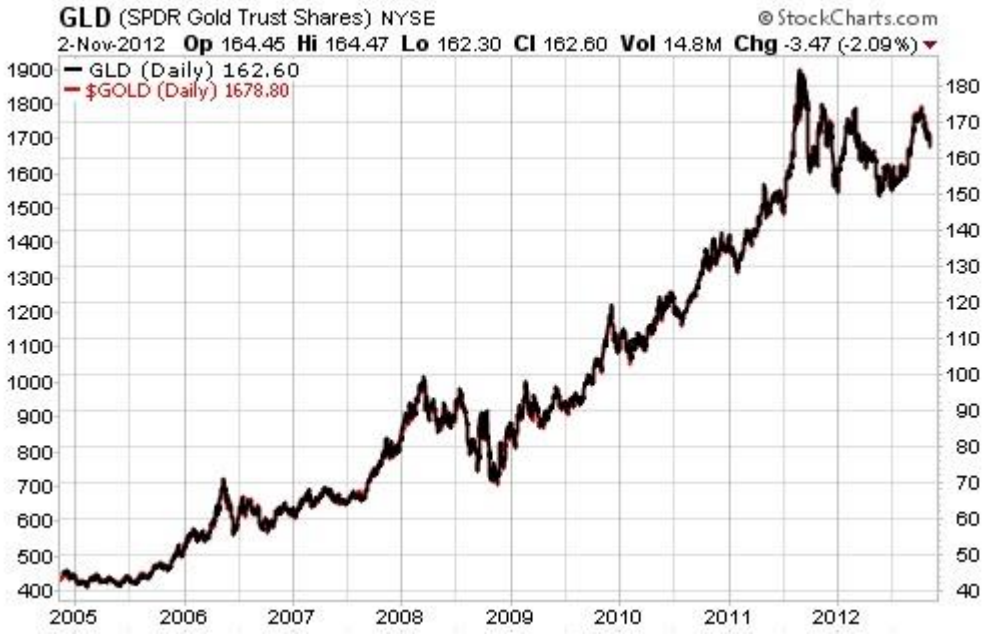
Foredrag ved Miljøringen 2014

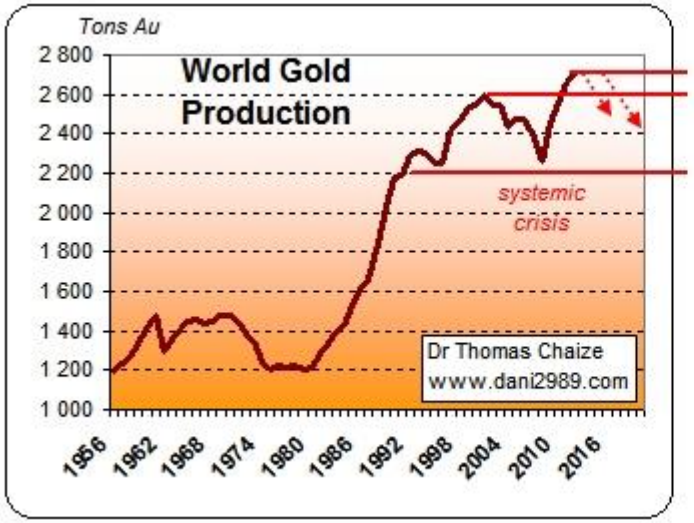

Image courtesy of First Uranium Corporation

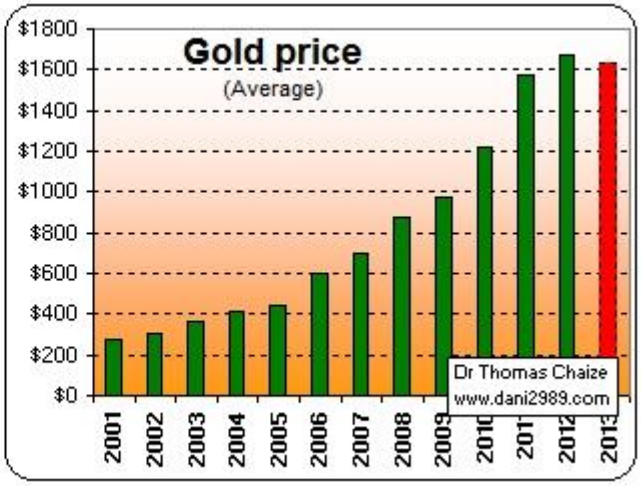
Noen fakta om gull

Priser og utvinning av gull

Gold Production


GLD (SPDR Gold Trust Shares) NYSE
©StockCharts.com
2-Nov-2012 Op 164.45 Hi 164.47 Lo 162.30 Cl 162.60 Vol 14.8M Chg -3.47 (-2.09%)
GLD (Daily) 162.60
$GOLD (Daily) 1678.80
2005
2006
2007
2008
2009
2010
2011
2012


Tons Au
World Gold Production
systemic crisis
Dr Thomas Chaize
www.dani2989.com


Gold price
(Average)
Dr Thomas Chaize
www.dani2989.com

Moderne bruk av Gull

- Gull som juveler
- Gull som investeringsobjekt
- Gull investinger som finansreserver i banker
- Gull i mynter
- Fortsatt bruk av gull i tannlegemedisin
- Annen medisinsk bruk:
  - Reumatismemedisin
  - Kreftbehandling
  - Medisinsk utstyr som pacemakere
  - Diagnose: nanoteknologi
  - Implantater
- Gull i telefoner:
  - Korroderer ikke
  - Snitt 33 gullforgylte kontakter/telefon, 0.034g/telefon
- Gull i datamaskiner
  - Koblinger til mikroprosessorer
  - Minne
  - Sølv og kobber leder strøm bedre, mens gull korroderer mindre
- Gull i andre elektriske apparater
  - All lavspenningsapparater
  - Korrosjonsegenskaper
  - Alt fra GPS til vaskemaskiner inneholder gull
- Romfart

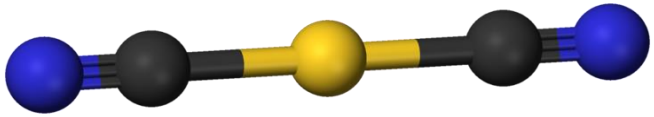
I bergarter som det graves etter **gull**

er det også **andre uønskede grunnstoffer:**
Spormetaller og **halvmetaller**.
Blant dem finner vi slike som ikke er direkte helsebringende!

Bergarten er gjerne rik på pyritt (FeS_2), som når den oksiderer i dagen danner svovelsyre: **AMD**

spormetaller og **arsen**

«Cyanidation»,
Ekstraksjon av gull og sølv:
(<10g/t, 0.001%):



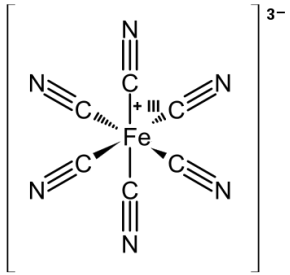
$$4\,Au + 8\,CN^- + O_2 + 2\,H_2O = 4\,Au(CN)_2^- + 4\,OH^-$$

Lagring av overskudssvann:

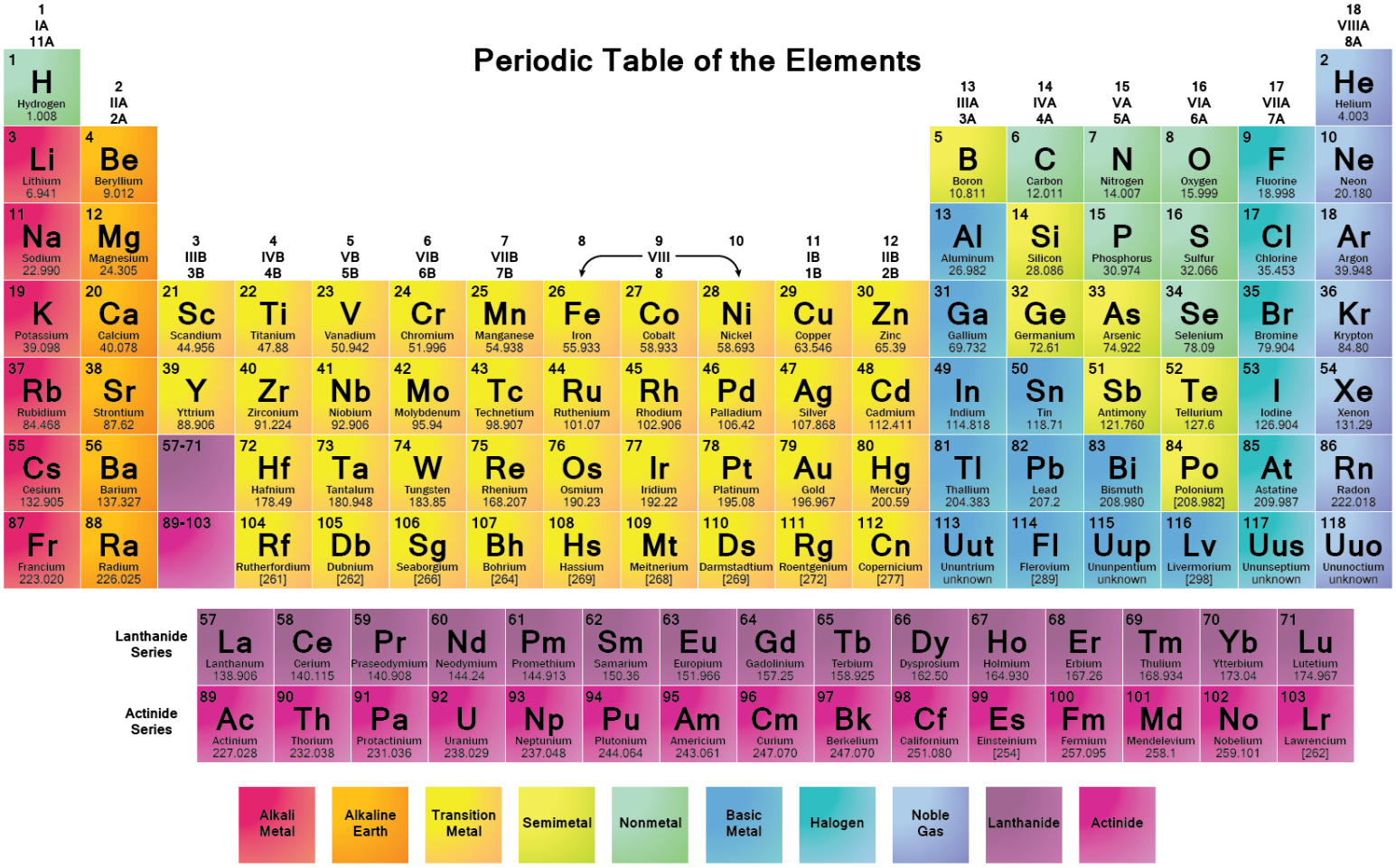
pH > 11

(for å forhindre dannelse av HCN, pK_a=9.21)

Risikerer utlekking av **As** and **CN**



Noen fakta om aresen (As)


Periodic Table of the Elements
1 IA 11A
2 IIA 2A
3 IIIB 3B
4 IVB 4B
5 VB 5B
6 VIB 6B
7 VIIB 7B
8 9 VIII 10
11 IB 1B
12 IIB 2B
13 IIIA 3A
14 IVA 4A
15 VA 5A
16 VIA 6A
17 VIIA 7A
18 VIIIA 8A
1 H Hydrogen 1.008
2 He Helium 4.003
3 Li Lithium 6.941
4 Be Beryllium 9.012
5 B Boron 10.811
6 C Carbon 12.011
7 N Nitrogen 14.007
8 O Oxygen 15.999
9 F Fluorine 18.998
10 Ne Neon 20.180
11 Na Sodium 22.990
12 Mg Magnesium 24.305
13 Al Aluminum 26.982
14 Si Silicon 28.086
15 P Phosphorus 30.974
16 S Sulfur 32.066
17 Cl Chlorine 35.453
18 Ar Argon 39.948
19 K Potassium 39.098
20 Ca Calcium 40.078
21 Sc Scandium 44.956
22 Ti Titanium 47.88
23 V Vanadium 50.942
24 Cr Chromium 51.996
25 Mn Manganese 54.938
26 Fe Iron 55.933
27 Co Cobalt 58.933
28 Ni Nickel 58.693
29 Cu Copper 63.546
30 Zn Zinc 65.39
31 Ga Gallium 69.732
32 Ge Germanium 72.61
33 As Arsenic 74.922
34 Se Selenium 78.09
35 Br Bromine 79.904
36 Kr Krypton 84.80
37 Rb Rubidium 84.468
38 Sr Strontium 87.62
39 Y Yttrium 88.906
40 Zr Zirconium 91.224
41 Nb Niobium 92.906
42 Mo Molybdenum 95.94
43 Tc Technetium 98.907
44 Ru Ruthenium 101.07
45 Rh Rhodium 102.906
46 Pd Palladium 106.42
47 Ag Silver 107.868
48 Cd Cadmium 112.411
49 In Indium 114.818
50 Sn Tin 118.71
51 Sb Antimony 121.760
52 Te Tellurium 127.6
53 I Iodine 126.904
54 Xe Xenon 131.29
55 Cs Cesium 132.905
56 Ba Barium 137.327
57-71
72 Hf Hafnium 178.49
73 Ta Tantalum 180.948
74 W Tungsten 183.85
75 Re Rhenium 186.207
76 Os Osmium 190.23
77 Ir Iridium 192.22
78 Pt Platinum 195.08
79 Au Gold 196.967
80 Hg Mercury 200.59
81 Tl Thallium 204.383
82 Pb Lead 207.2
83 Bi Bismuth 208.980
84 Po Polonium [208.982]
85 At Astatine 209.987
86 Rn Radon 222.018
87 Fr Francium 223.020
88 Ra Radium 226.025
89-103
104 Rf Rutherfordium [261]
105 Db Dubnium [262]
106 Sg Seaborgium [266]
107 Bh Bohrium [264]
108 Hs Hassium [269]
109 Mt Meitnerium [268]
110 Ds Darmstadtium [269]
111 Rg Roentgenium [272]
112 Cn Copernicium [277]
113 Uut Ununtrium unknown
114 Fl Flerovium [289]
115 Uup Ununpentium unknown
116 Lv Livermorium [298]
117 Uus Ununseptium unknown
118 Uuo Ununoctium unknown
Lanthanide Series
57 La Lanthanum 138.906
58 Ce Cerium 140.115
59 Pr Praseodymium 140.908
60 Nd Neodymium 144.24
61 Pm Promethium 144.913
62 Sm Samarium 150.36
63 Eu Europium 151.966
64 Gd Gadolinium 157.25
65 Tb Terbium 158.925
66 Dy Dysprosium 162.50
67 Ho Holmium 164.930
68 Er Erbium 167.26
69 Tm Thulium 168.934
70 Yb Ytterbium 173.04
71 Lu Lutetium 174.967
Actinide Series
89 Ac Actinium 227.028
90 Th Thorium 232.038
91 Pa Protactinium 231.036
92 U Uranium 238.029
93 Np Neptunium 237.048
94 Pu Plutonium 244.064
95 Am Americium 243.061
96 Cm Curium 247.070
97 Bk Berkelium 247.070
98 Cf Californium 251.080
99 Es Einsteinium [254]
100 Fm Fermium 257.095
101 Md Mendelevium 258.1
102 No Nobelium 259.101
103 Lr Lawrencium [262]
Alkali Metal
Alkaline Earth
Transition Metal
Semimetal
Nonmetal
Basic Metal
Halogen
Noble Gas
Lanthanide
Actinide
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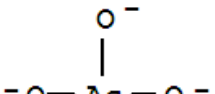
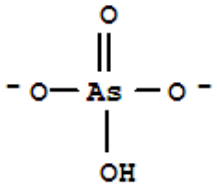
chemistry.about.com
sciencenotes.org

Inorganic arsenic in the environment



Arsenite

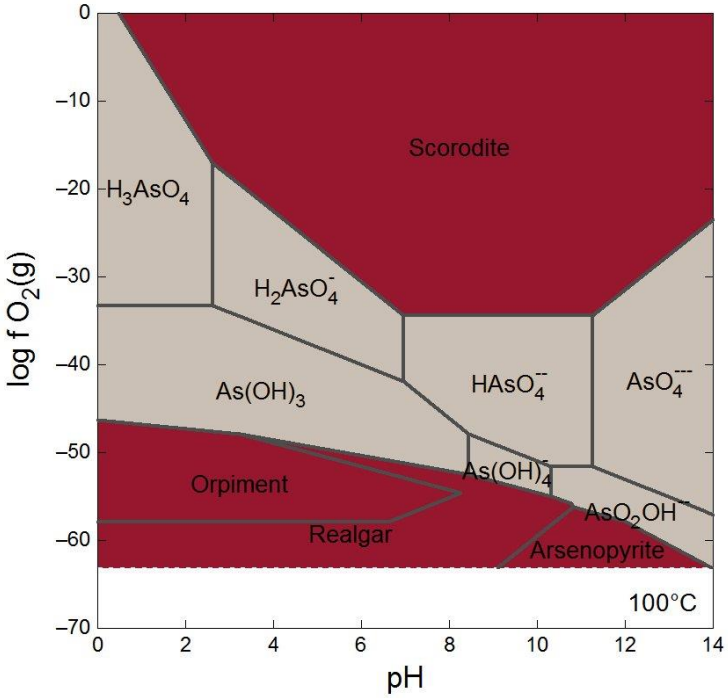
$As(OH)_3$ (9.2 and 12.1)
(H_3AsO_3)

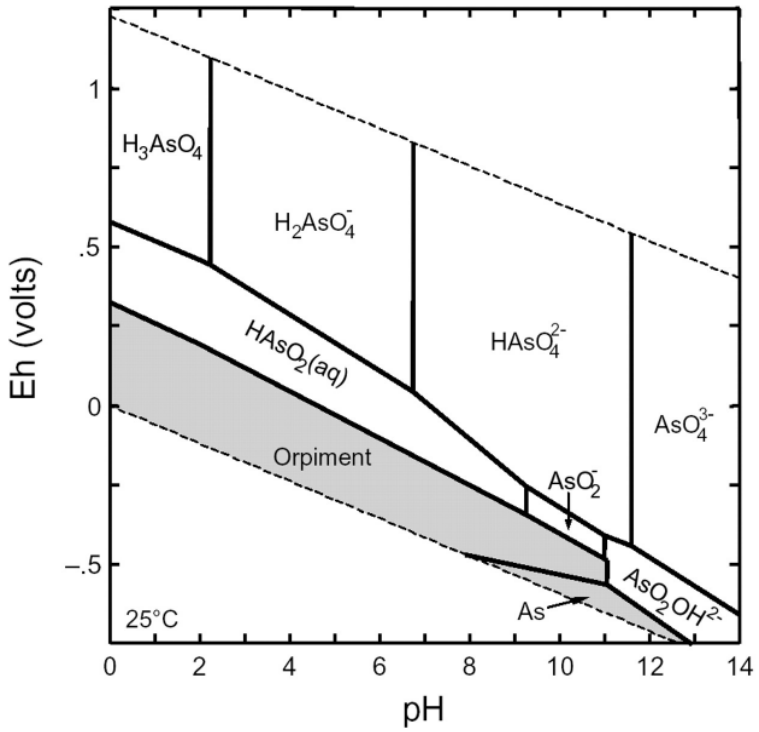


Arsenate

H_3AsO_4 (2.2 and 6.9)

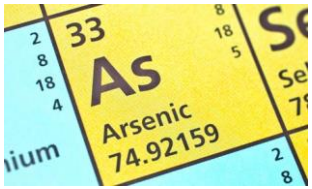
$FeAsO_4$





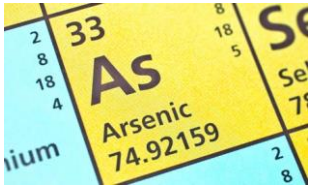
As_2S_2 AsS FeAsS

Arsen og noen interessante fakta



- **Properties:**
  - Arsenic has a valence of -3, 0, +3, or +5.
  - The elemental solid primarily occurs in two modifications:
    - (Yellow arsenic has a specific density of 1.97 g/cm^3,) while
    - Grey or metallic arsenic has a specific gravity of 5.73 g/cm^3. Grey arsenic is the usual stable form, with a melting point of 817°C (28 atm) and sublimation point at 613°C. Grey arsenic is a very brittle semi-metallic solid. It is steel-grey in colour, crystalline, tarnishes readily in air, and is rapidly oxidized to arsenous oxide (As_2O_3) upon heating (arsenous oxide exudes the odour of garlic). Arsenic and its compounds are poisonous.
- **Element Classification:** Semimetallic, forms oxyanions
- **Density (g/cm^3):** 5.73 (grey arsenic)

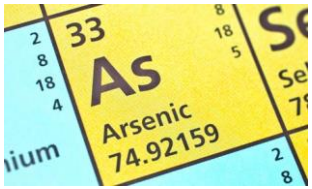
Arsen og noen interessante fakta



- **Sources:**
  - Arsenic is found in realgar and orpiment as its sulfides,
  - As arsenides and sulfaresenides of heavy metals (Fe, Mn),
  - As arsenates, and as its oxide.
  - The most common mineral is Mispickel or arsenopyrite (FeSAs), which can be heated to sublime arsenic, leaving ferrous sulfide.

- **Uses:**
  - Arsenic is used as a doping agent in solid-state devices.
  - Gallium arsenide is used in lasers which convert electricity into coherent light.
  - Arsenic is used in pyrotechnics, hardening and improving the sphericity of shot, and in bronzing.
  - Arsenic compounds are used as insecticides and in other poisons.

Arsenic and some short facts



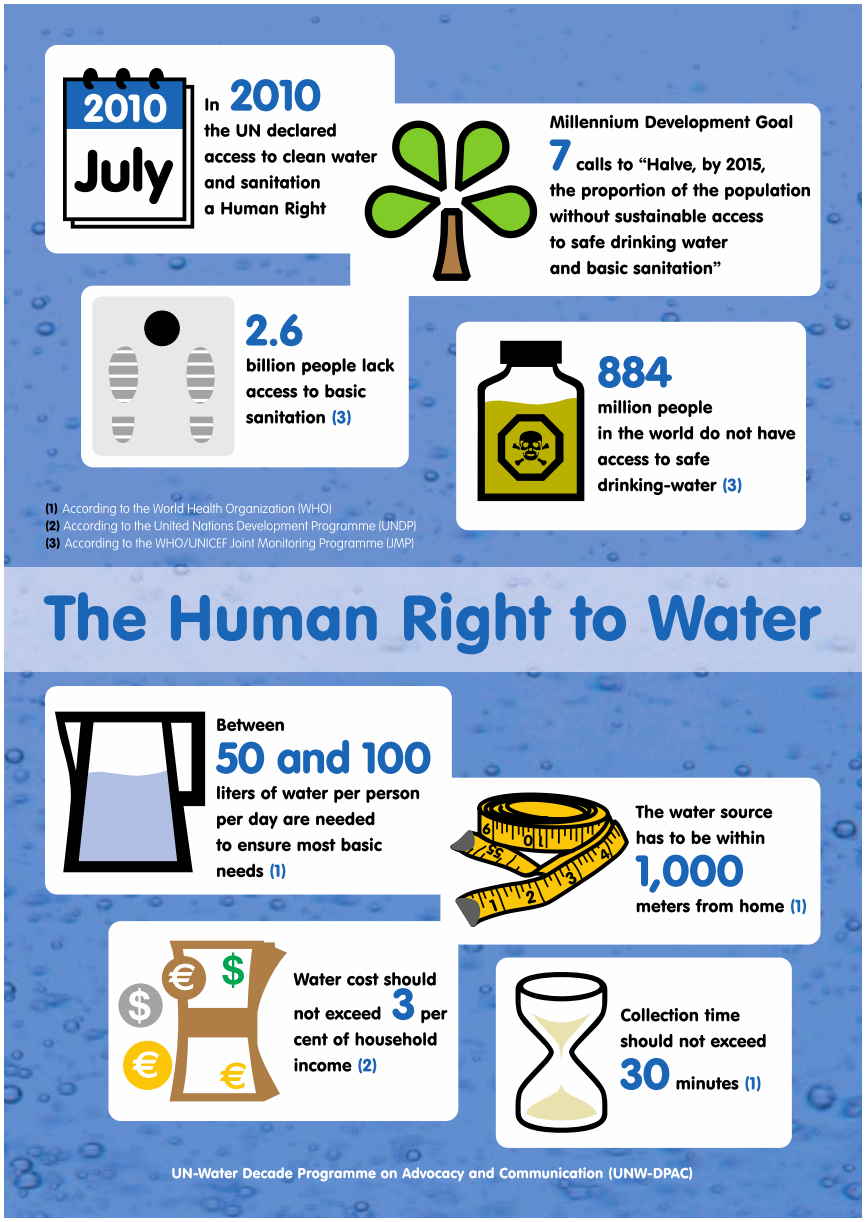
- Early bronze age: As-bronze artefacts found in Israelis Judean Desert (≈3000 BC)
- Orpiment (As_2S_3) was found in Tutankhamen's tomb
- The preferred poison in the Roman Empire & Middle Ages & China
- 18th and 19th century: Arsenic green ($CuAsHO_3$) widely used in wall papers:≈ 30 g As/m^2 (i.e. 3 kg in 100 m^2)
- 19th century-present: As used in medicines
- 20th century: As pesticides, herbicides and wood preservatives

Wall paper coloured with arsenic green

Emperor Guangxu, poisoned with As

Feltstudier

Tanzania, Guatemala og Laos


2010
July
In 2010
the UN declared
access to clean water
and sanitation
a Human Right
Millennium Development Goal
7 calls to "Halve, by 2015,
the proportion of the population
without sustainable access
to safe drinking water
and basic sanitation"
2.6
billion people lack
access to basic
sanitation (3)
884
million people
in the world do not have
access to safe
drinking-water (3)
(1) According to the World Health Organization (WHO)
(2) According to the United Nations Development Programme (UNDP)
(3) According to the WHO/UNICEF Joint Monitoring Programme (JMP)
The Human Right to Water
Between
50 and 100
liters of water per person
per day are needed
to ensure most basic
needs (1)
The water source
has to be within
1,000
meters from home (1)
Water cost should
not exceed 3 per
cent of household
income (2)
Collection time
should not exceed
30 minutes (1)
UN-Water Decade Programme on Advocacy and Communication (UNW-DPAC)


Addis Abeba
Etiopia
Tsjadsjøen
N'Djamena
South Sudan
Somalia
Juba
Den sentralafrikanske republikk
Turkanasjøen
Mogadishu
Bangui
Albertsjøen
Uganda
Kampala
Kenya
Nairobi
Victoriasjøen
Kongo
Rwanda
Kigali
Seychellene
Den demokratiske republikken Kongo
Bujumbura
Burundi
Tanzania
Dodoma
Brazzaville
Kinshasa
Tanganyikasjøen
Rukwasjøen
Mwerusjøen
Glorieusesøyene
Komorene
Moroni
Mamoudzou
Mayotte
Luanda
Malawisjøen
Angola
Malawi
Tromelinøya
Lilongwe
Zambia
Lusaka
US Dept of State Geographer
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© 2013 Cnes/Spot Image
Juan de Nova Island
©2010 Google
Port Louis
Antananarivo
Bildedato: 4/24/2006
4°11'48.33" S 37°48'15.88" Ø elevasjon 809 m
Øyehøyde 4294.44 km


Coatzacoalcos
Villahermosa
Tabasco
Tuxtla Gutierrez
Chiapas
Comitan
Peten
Corozal
Ambergris Cay
Belize Fan
Orange Walk
Belize
Belmopan
Cayo
Belize
Stann Creek
Toledo
Islas de la Bahia
La Ceiba
San Pedro Sula
Guatemala
San Marcos
Guatemala
Tapachula
Quetzaltenango
Guatemala by
Honduras
Tegucigalpa
El Salvador
San Salvador
San Miguel
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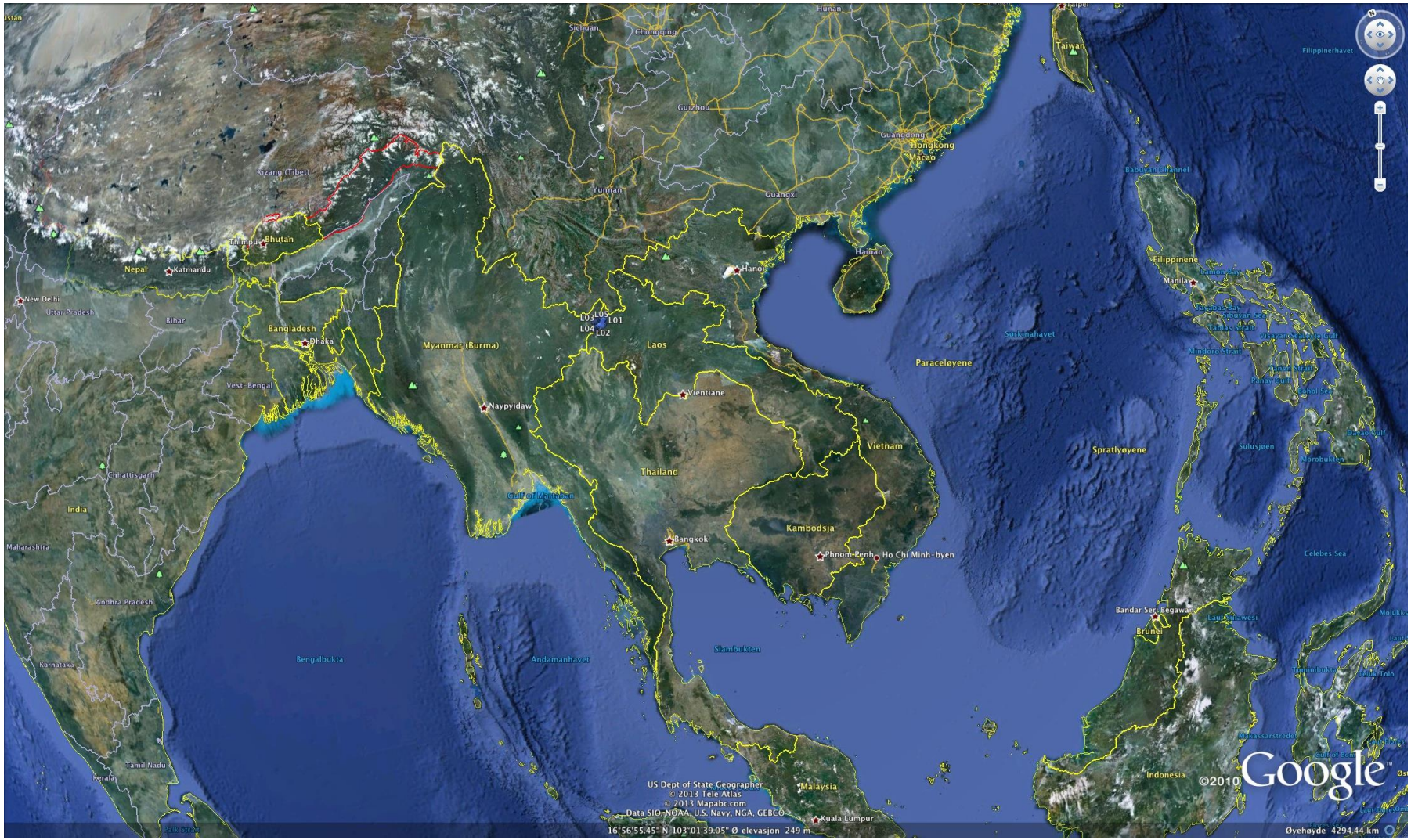
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
15°39'49.75" N 90°22'49.13" V elevasjon 784 m
©2010 Google
Øyehøyde 845.92 km


Sichuan
Chongqing
Hunan
Guizhou
Guangdong
Hongkong
Macao
Taiwan
Filippinerhavet
Babuyan Channel
Xizang (Tibet)
Yunnan
Guangxi
Hainan
Tibet
Bhutan
Nepal
Katmandu
Hanoi
Filippinene
Manila
New Delhi
Uttar Pradesh
Bihar
Bangladesh
Dhaka
Myanmar (Burma)
Laos
L01
L02
L03
L04
L05
Sørkinahavet
Paraceløyene
Vest-Bengal
Naypyidaw
Vientiane
Vietnam
Spratlyøyene
Sulusjøen
Thailand
Chhattisgarh
India
Gulf of Martaban
Kambodsja
Bangkok
Phnom Penh
Ho Chi Minh-byen
Maharashtra
Celebes Sea
Andhra Pradesh
Bandar Seri Begawan
Brunei
Bengalbukta
Andamanhavet
Siambukten
Karnataka
Tamil Nadu
Kerala
Malaysia
Indonesia
Kuala Lumpur
US Dept of State Geographer
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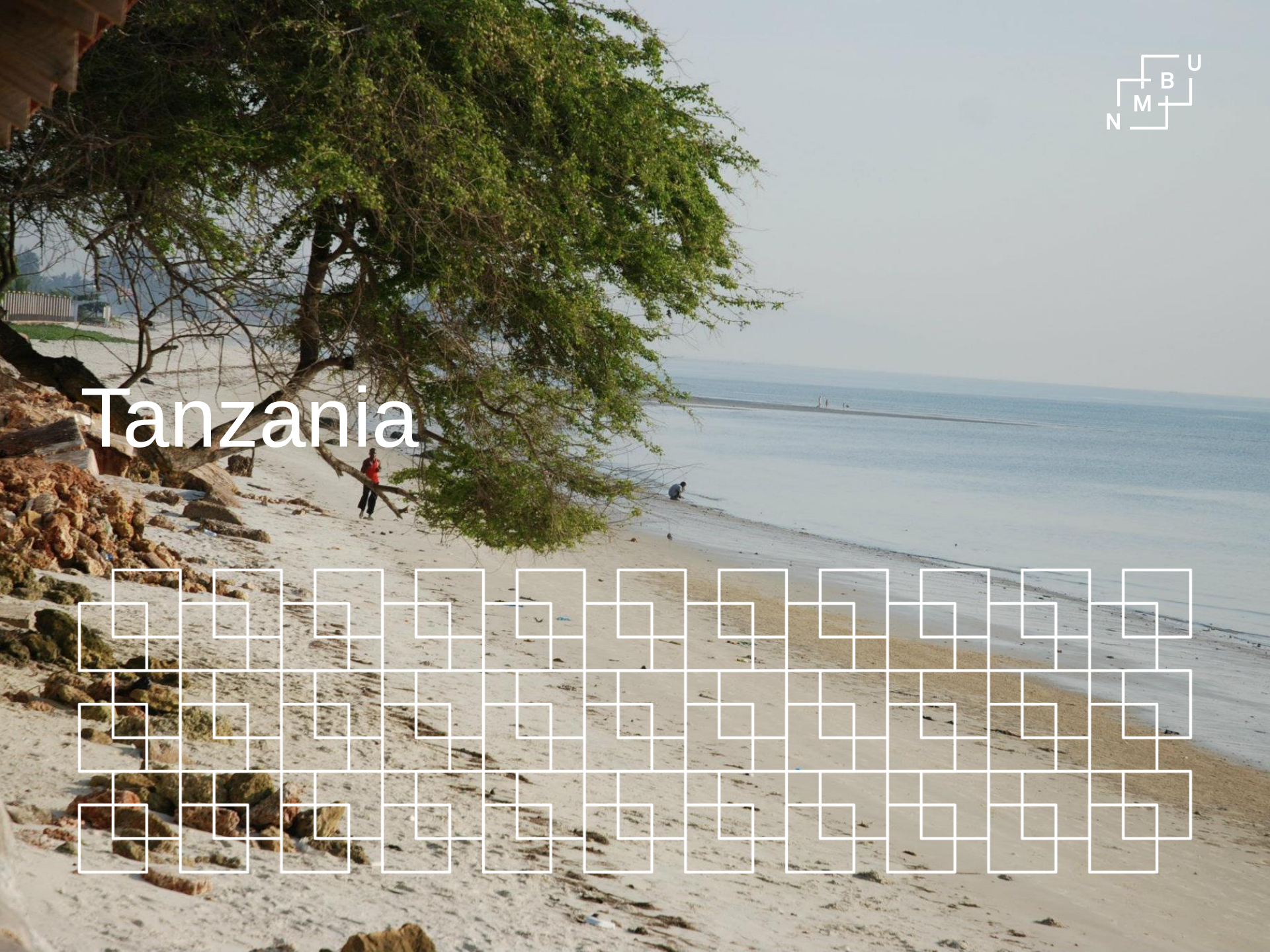
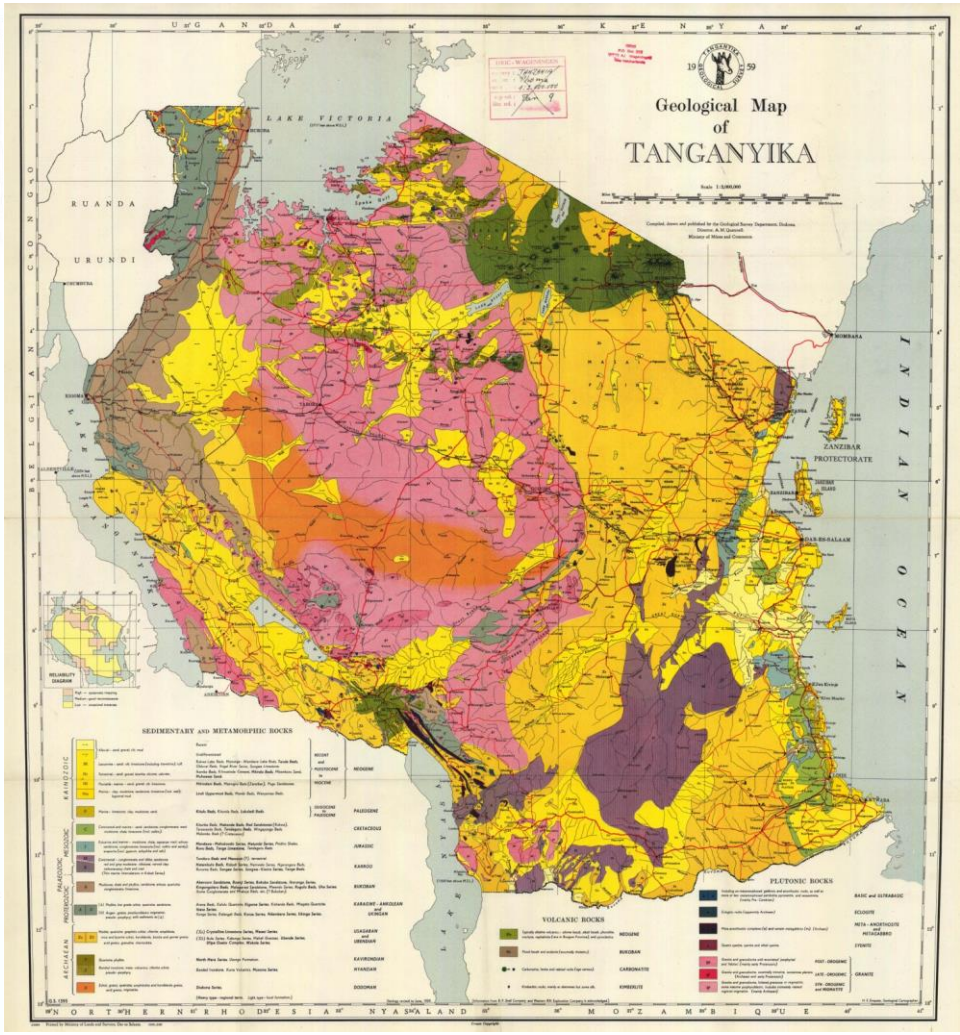
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
©2010 Google
16°56'55.45" N 103°01'39.05" Ø elevasjon 249 m
Øyehøyde 4294.44 km

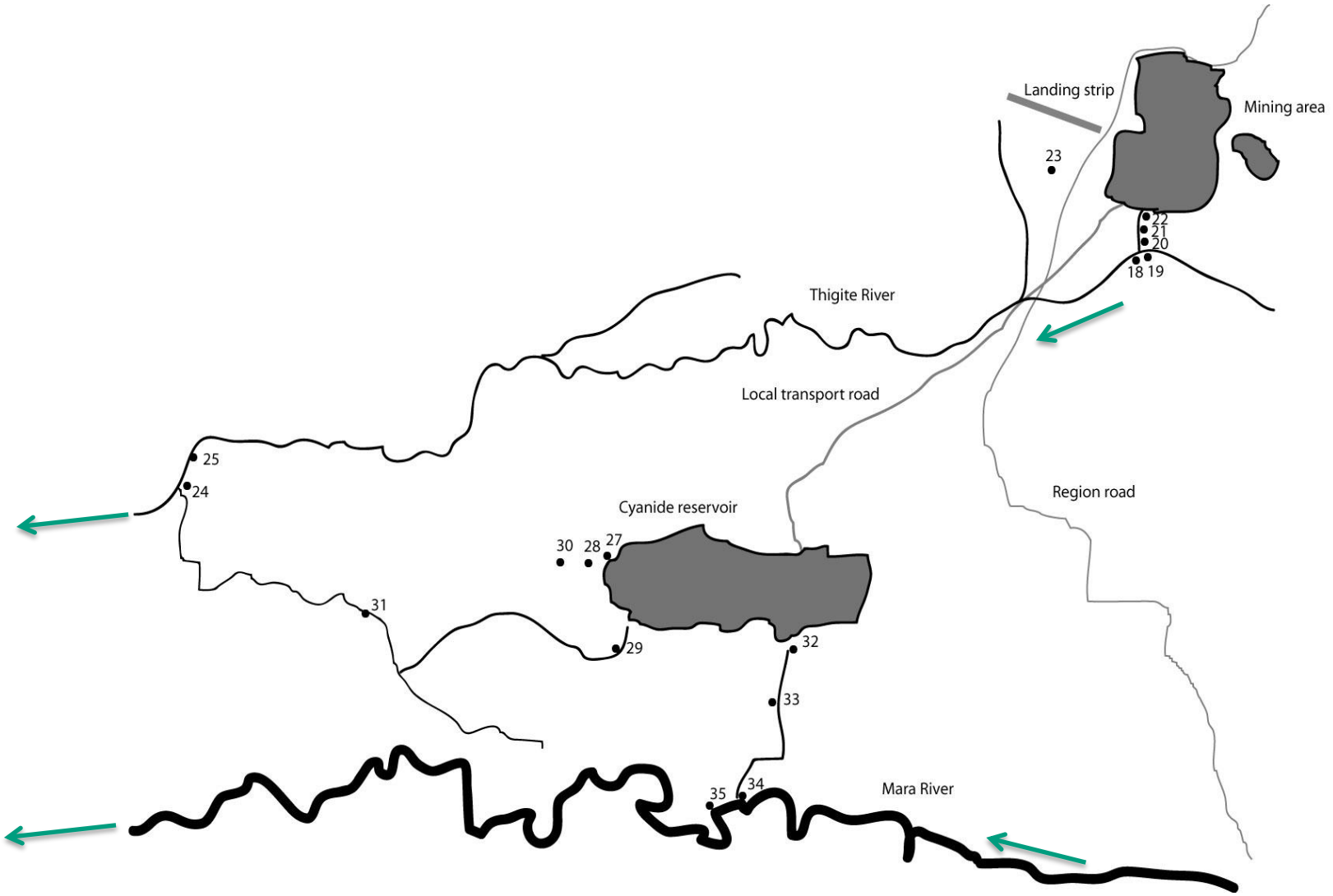

Tanzania


Regions of Zanzibar*
1 Pemba North
2 Pemba South
3 Zanzibar North
4 Zanzibar Urban/West
5 Zanzibar Central/South
*Zanzibar comprises the islands of Zanzibar and Pemba.
UGANDA
KENYA
RWANDA
BURUNDI
ZAMBIA
MALAWI
MOZAMBIQUE
DEM. REP. OF THE CONGO
Lake Victoria
Kampala
Nairobi
Mombasa
Dar es Salaam
DAR ES SALAAM
Dodoma
(legislative capital)
Zanzibar
Pemba
Mafia Island
KAGERA
MARA
MWANZA
SHINYANGA
KIGOMA
TABORA
SINGIDA
DODOMA
ARUSHA
TANGA
MOROGORO
PWANI
RUKWA
MBEYA
IRINGA
LINDI
MTWARA
RUVUMA
Tanzania
International boundary
Region boundary
National capital
Province capital
Railroad
Road
Track
0 50 100 150 Kilometers
0 50 100 150 Miles
Lambert Conformal Conic Projection, SP 2S/12S
Base 802933AI (C00485) 3-03


Geological Map
of
TANGANYIKA
LAKE VICTORIA
RUANDA
URUNDI
INDIAN OCEAN
ZANZIBAR PROTECTORATE
SEDIMENTARY AND METAMORPHIC ROCKS
VOLCANIC ROCKS
PLUTONIC ROCKS
NORTHERN RHODESIA
NYASALAND
MOZAMBIQUE

Beyond Borders

BARRICK


Landing strip
Mining area
23
22
21
20
18 19
Thigite River
Local transport road
Region road
25
24
Cyanide reservoir
30 28 27
31
29
32
33
35 34
Mara River

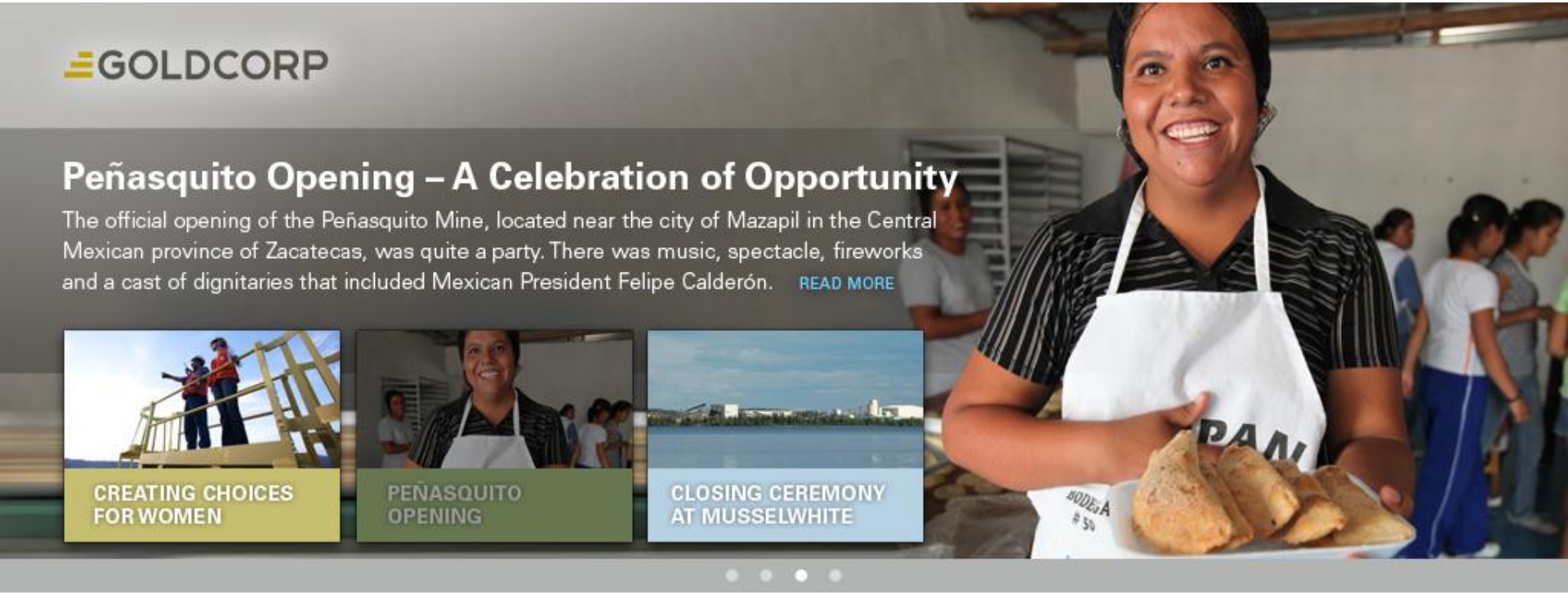
Site	CN_{TOT}	Al	Ag	As	Au	Cd	Co	Cr	Cu	Hg	Ni	Pb	Se	Th	U	V	Zn
	mg/l	mg/l[a]								µg/l							
18	-	363.00	0.7	307.0	0.4	108.00	4583.0	254.2	1670.1	0.5	9962.3	7.80	111.4	33.8	464.5	1.44	43473.3
19	-	0.28	0.1	1.1	nd	0.01	0.1	nd	1.1	0.4	0.9	0.07	1.0	0.2	0.5	0.98	1.9
21	-	571.00	0.6	514.0	0.2	149.00	6390.5	626.4	3443.2	0.3	15603.8	0.56	69.9	93.2	899.3	5.26	59215.4
22	-	781.00	1.1	8449.0	0.0	224.00	9185.9	951.9	4467.0	0.2	22566.6	3.95	94.3	169.2	1263.4	39.78	94608.1
23	-	0.06	0.0	0.1	nd	0.02	0.1	0.3	0.3	0.1	1.3	0.02	0.6	0.0	0.0	0.45	14.0
25	-	0.11	0.0	1.7	0.0	0.12	2.6	0.6	2.6	0.1	20.9	0.02	1.6	0.0	3.4	1.31	9.7
27	nd	0.05	0.2	1142.0	16	0.26	269.5	nd	2.8	5.9	22.4	0.00	25.9	0.2	0.4	4.61	17.5
29	0.002	0.00	0.1	413.0	10	0.06	319.0	nd	4.1	2.3	12.0	0.00	7.1	0.1	9.1	3.97	6.0
30	-	0.00	0.0	1.4	0.2	0.01	79.0	0.5	1.0	0.0	3.5	0.01	1.7	0.0	0.0	0.67	1.6
31	0.001	0.02	0.0	8.0	0.2	0.02	30.7	0.3	0.9	0.0	4.5	0.05	1.5	0.0	0.2	1.17	2.4
32	nd	0.01	0.0	131.0	2.7	0.02	2.8	0.6	4.7	0.0	12.9	0.02	43.7	0.0	2.0	2.93	11.8
33	-	0.06	0.1	111.0	0.4	0.00	0.8	0.6	5.3	0.5	7.8	0.02	4.3	0.0	12.9	5.74	1.2
34	-	0.03	0.0	0.9	0.2	0.01	0.2	0.4	1.7	0.1	1.7	0.04	0.8	0.0	1.2	3.04	2.0
35	-	0.03	0.1	28.0	0.3	0.00	1.4	0.7	0.8	0.1	1.9	0.14	1.1	0.1	0.4	2.60	1.0
36	-	0.04	0.0	0.7	0.2	0.00	0.4	0.5	0.5	0.0	1.0	0.10	0.8	0.1	0.0	0.60	3.6
WHO:																	
mg/l	0.07	-[c]															
µg/l			-	10	-	3	-	50	2000	6	70	10	10	-	15	-	3000[d]

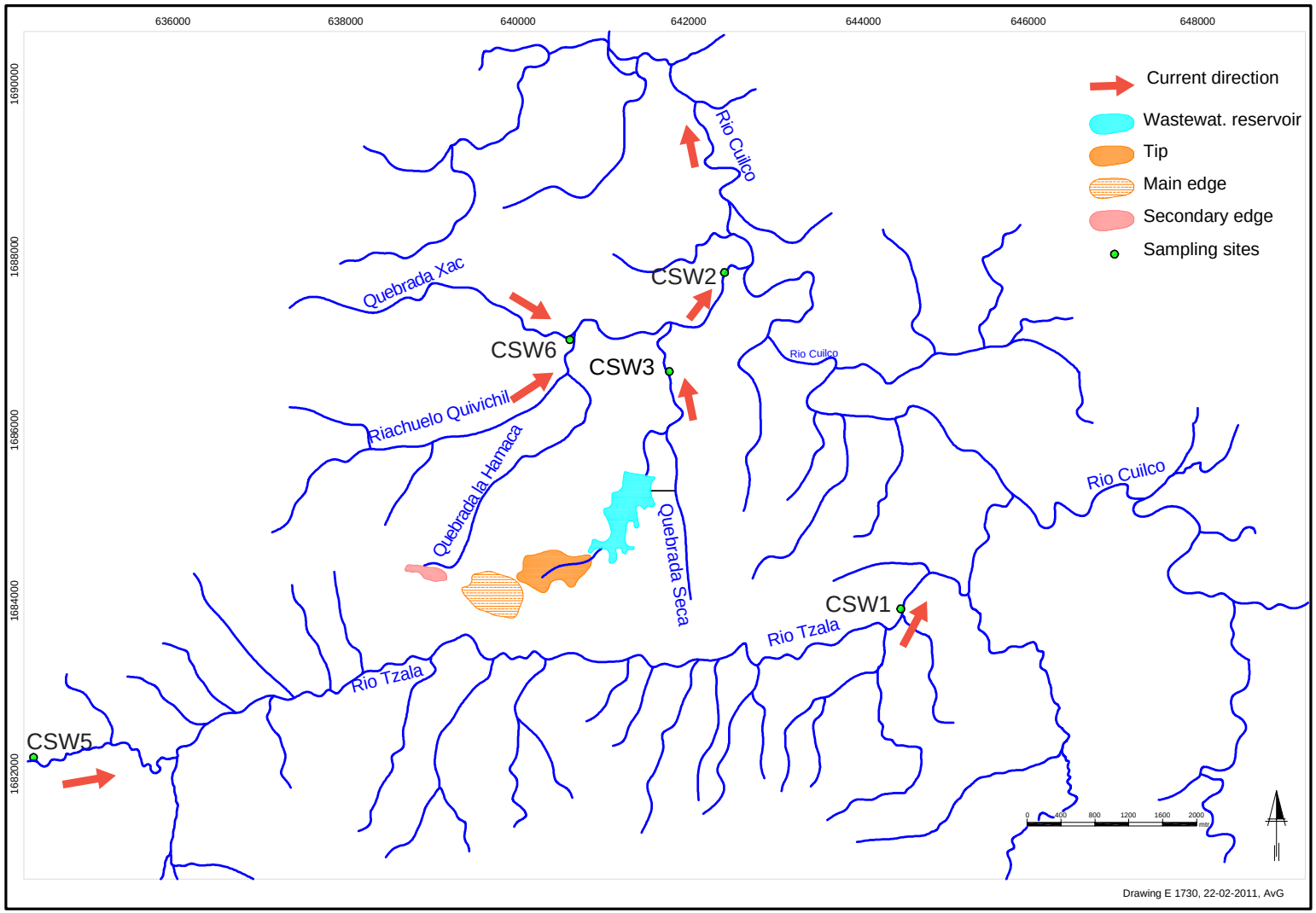

As (ug/g)
0
1
2
3
4
0
10
20
30
40
50
60
70
80
90
Age

Guatemala

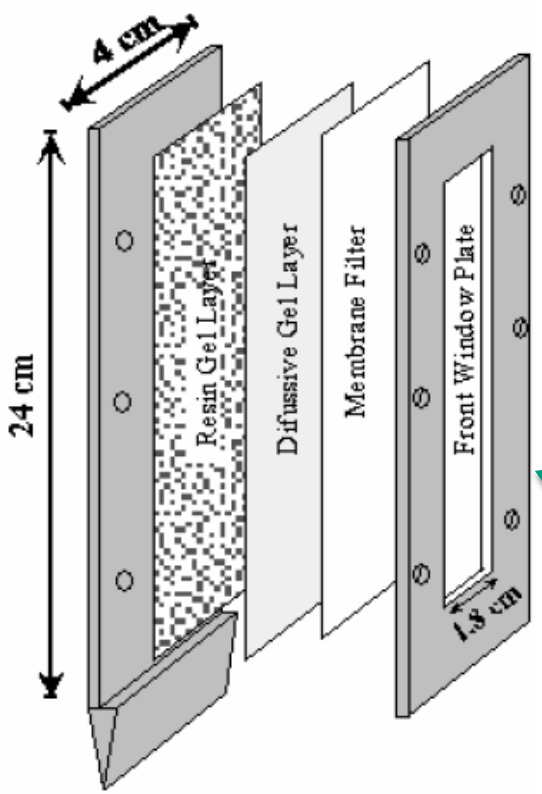
Sipakapa

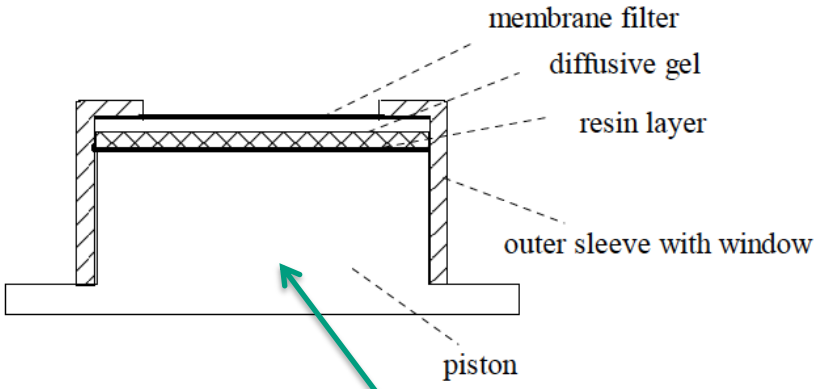

Villahermosa
TABASCO
Emiliano Zapata
Tenosique
CAMPECHE
QUINTANA ROO
Orange Walk
Belize
BELMOPAN
San Ignacio
Dangriga
BELIZE
CARIBBEAN SEA
Gulf of Honduras
PETÉN
Santa Amelia
Dos Lagunas
El Remate
Carmelita
Uaxactún
El Ceibo
Paso Caballos
Tikal
Melchor de Mencos
Flores
El Cruce
San Diego
San Benito
La Libertad
Santa Ana
El Ceibal
Sayaxché
Dolores
Poptún
San Luis
San Antonio
Punta Corda
Tuxtla Gutiérrez
San Cristóbal de las Casas
CHIAPAS
Comitán de Domínguez
Presa de la Angostura
Chinajá
Santa Amelia
Modesto Méndez
Livingston
Bahía de Amatique
Cabo Tres Puntas
Puerto Cortés
Tela
Puerto Barrios
Fincas la Inca
Entre Ríos
IZABAL
Lago de Izabal
El Estor
Morales
Mariscos
Bobos
San Pedro Sula
El Progreso
Los Amates
Panzós
Cahabón
Senahú
Chisec
Sebol
Chahal
Yiquiché
QUICHÉ
ALTA VERAPAZ
Cobán
San Pedro Carchá
San Cristóbal Verapaz
Chajul
Nebaj
Uspantán
Chiantla
Huehuetenango
Sacapulas
Malacatancito
Tectitán
Momostenango
Huixtla
Tapachula
San Marcos
Santa Cruz del Quiché
Joyabal
Salama
Rabinal
San Agustín Acasaguastlán
Río Hondo
Gualán
Zacapa
Totonicapán
Quezaltenango
Pajapita
Ciudad Tecún Umán
Coatepeque
Retalhuleu
Ocós
Solola
Chimaltenango
GUATEMALA
El Progreso
Sanarate
San Raimundo
Chiquimula
Jalapa
San Luis
Ipala
Esquipulas
Santa Rosa de Copán
HONDURAS
Lago de Yojoa
Mazatenango
Río Bravo
Champerico
Pueblo Nuevo Tiquisate
Sta Lucia Cotzumalguapa
Antigua
Amatitlán
Lago de Amatitlán
Lago de Ayarza
Escuintla
Cuilapa
Asunción Mita
Jutiapia
Monjas
Jalpatagua
Chiquimulilla
Guazacapán
Masagua
La Gomera
Nueva Venecia
Huitzitzil
Semillero
Tecojate
Sipacate
Iztapa
San José
Las Lilas
PACIFIC OCEAN
Comayagua
TEGUCIGALPA
Santa Ana
EL SALVADOR
SAN SALVADOR
1 HUEHUETENANGO
2 SAN MARCOS
3 QUEZALTENANGO
4 TOTONICAPÁN
5 BAJA VERAPAZ
6 EL PROGRESO
7 ZACAPA
8 CHIQUIMULA
9 JALAPA
10 GUATEMALA
11 SACATEPÉQUEZ
12 CHIMALTENANGO
13 RETALHULEU
14 SUCHITEPÉQUEZ
15 ESCUINTLA
16 SANTA ROSA
17 JUTIAPA
GUATEMALA
0 km 30 60 90 km

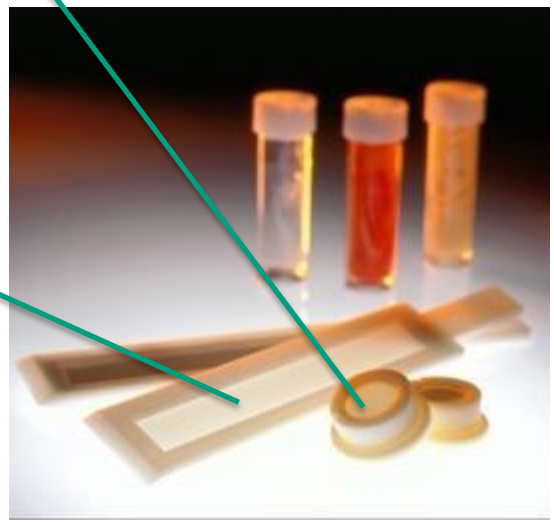

GOLDCORP
Peñasquito Opening – A Celebration of Opportunity
The official opening of the Peñasquito Mine, located near the city of Mazapil in the Central Mexican province of Zacatecas, was quite a party. There was music, spectacle, fireworks and a cast of dignitaries that included Mexican President Felipe Calderón. READ MORE
CREATING CHOICES FOR WOMEN
PEÑASQUITO OPENING
CLOSING CEREMONY AT MUSSELWHITE


636000
638000
640000
642000
644000
646000
648000
1690000
1688000
1686000
1684000
1682000
Current direction
Wastewat. reservoir
Tip
Main edge
Secondary edge
Sampling sites
Rio Cuilco
Quebrada Xac
CSW2
CSW6
CSW3
Rio Cuilco
Riachuelo Quivichil
Quebrada la Hamaca
Quebrada Seca
Rio Cuilco
CSW1
Rio Tzala
Rio Tzala
CSW5
0
400
800
1200
1600
2000
mtr
Drawing E 1730, 22-02-2011, AvG

DGT-Disk/Probe







Resin laget består av Fe-oksid som binder P irreversibelt,
Diffusjonsgelen ”diffusive gel” stenger ute komplekser

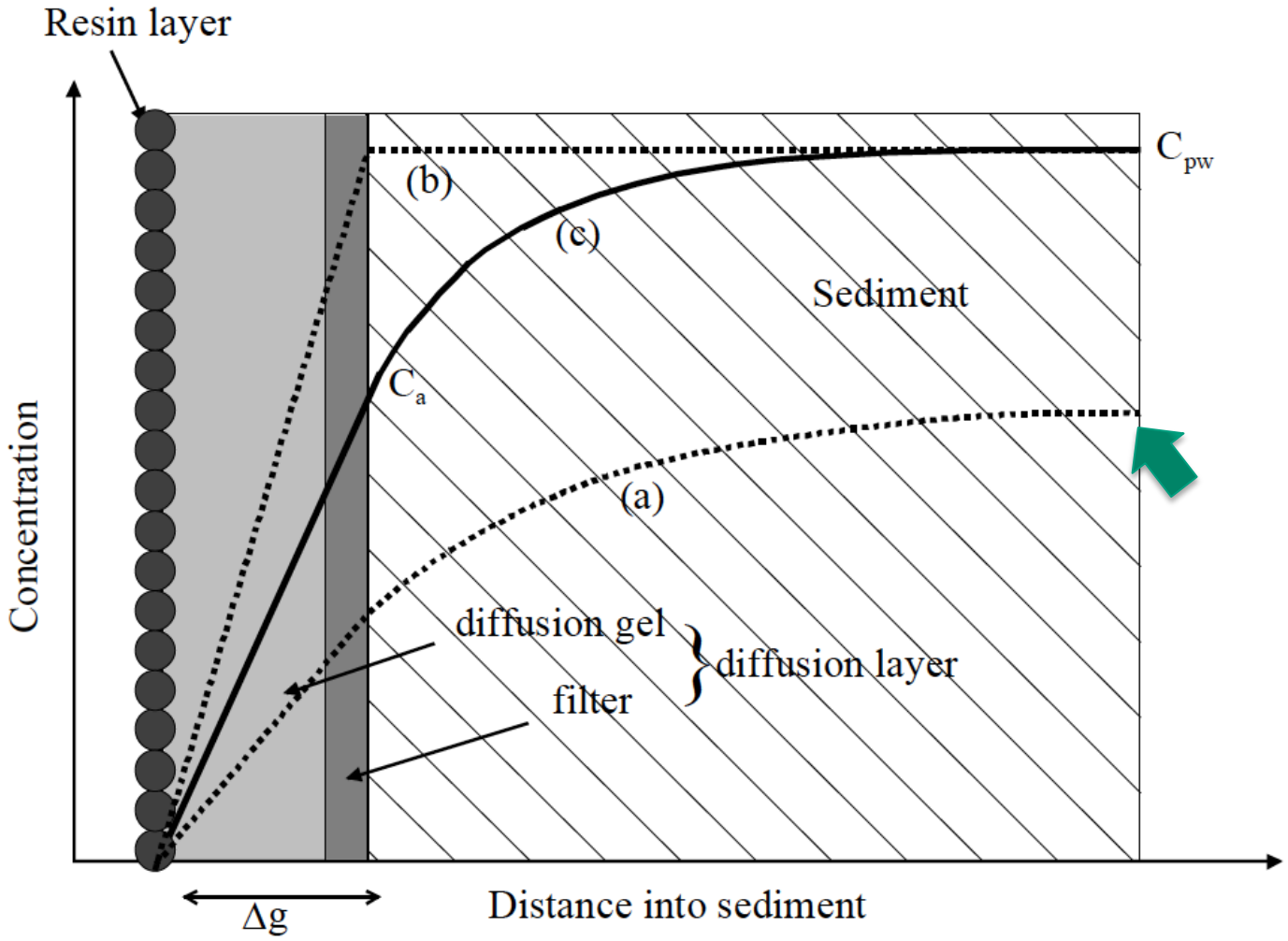
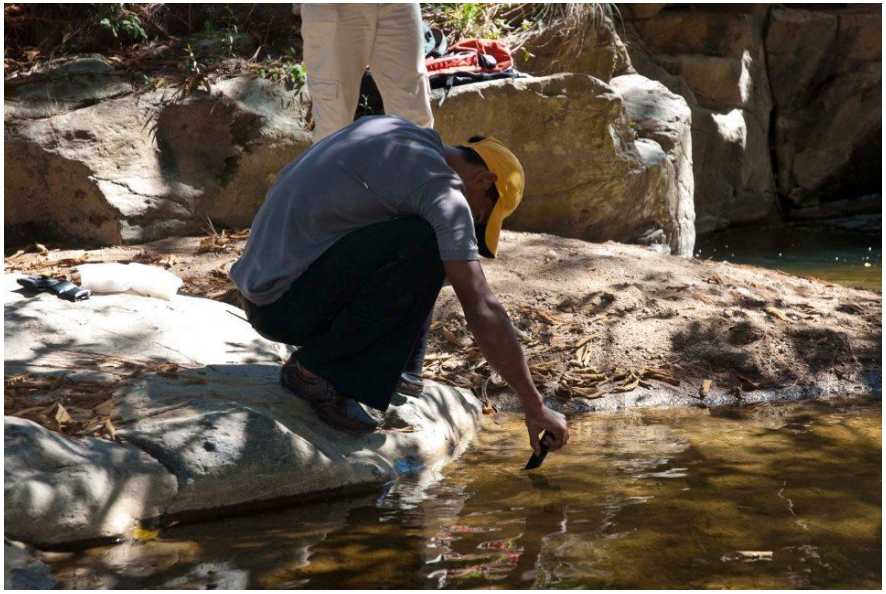
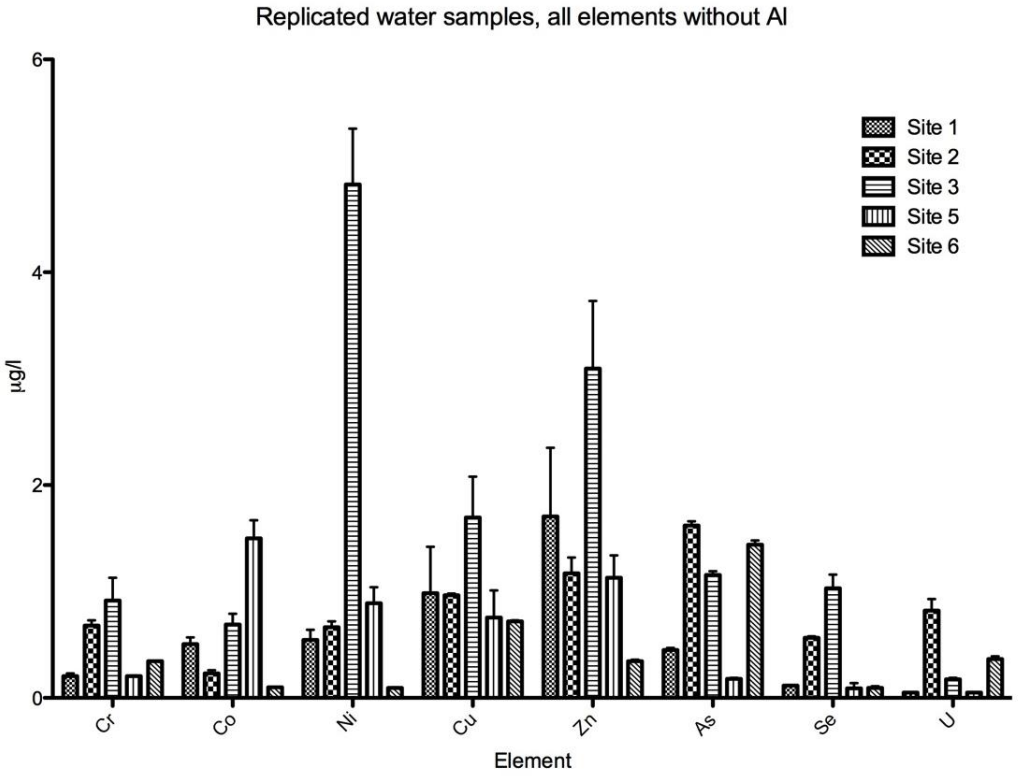
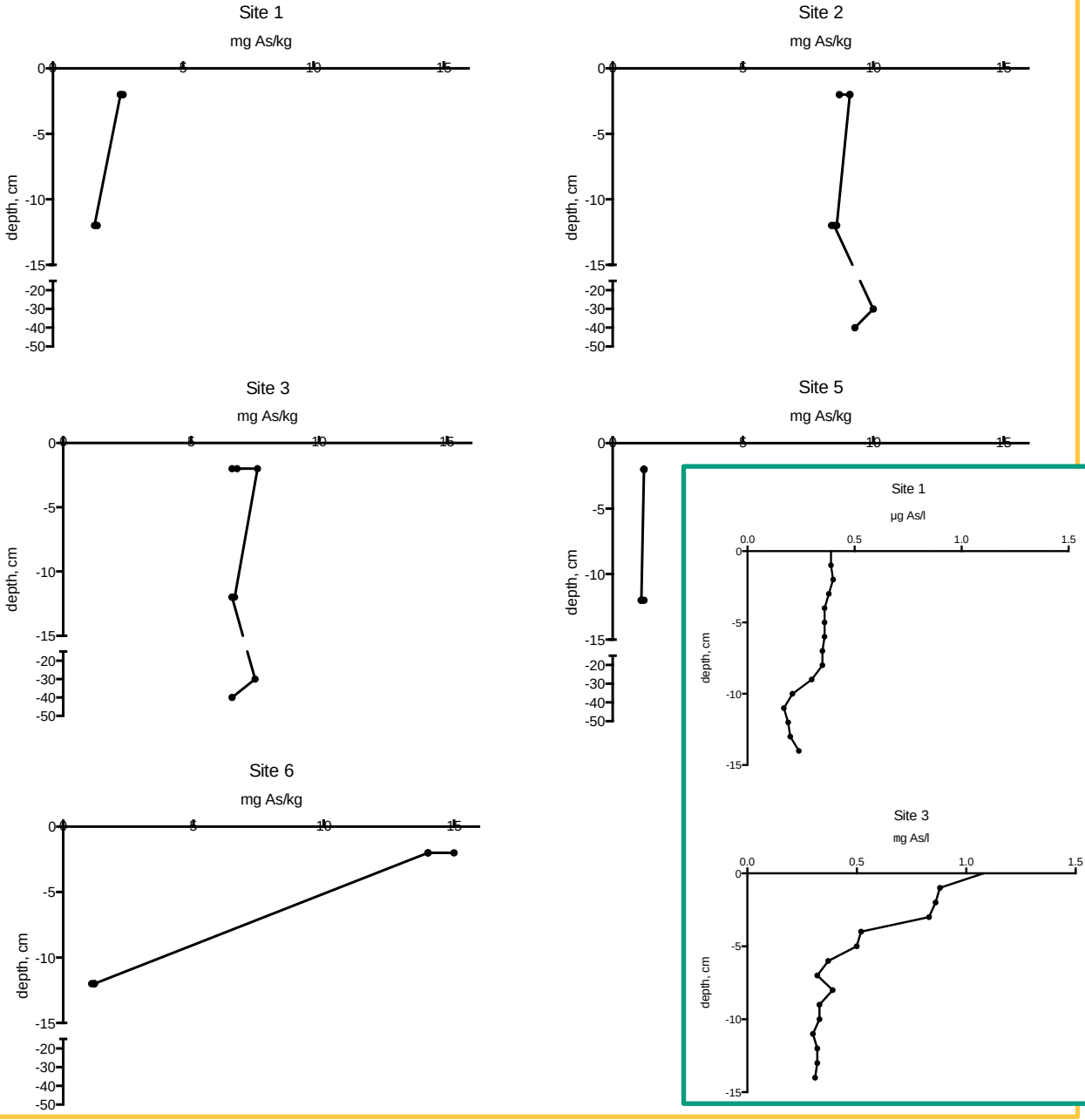
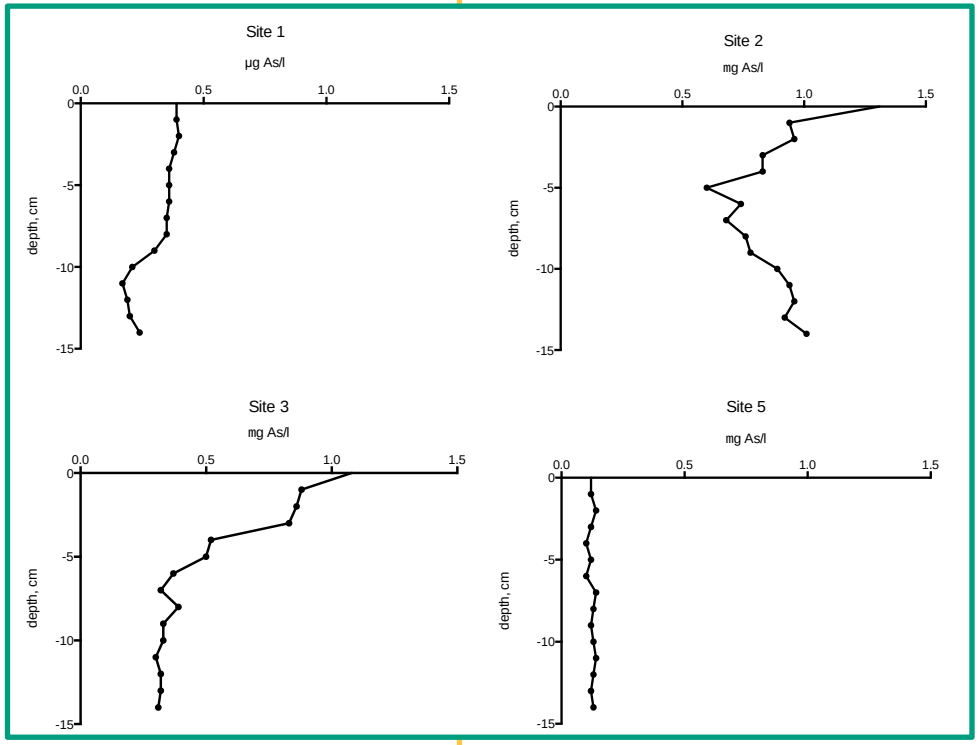


Figure 1. Schematic representation of a cross section through a DGT device in contact with a soil or sediment. Pseudo steady-state concentration gradients are illustrated for three cases: (a) unsustained, (b) sustained and (c) the general or partially sustained case. C_a is the interfacial pore water concentration between the sediment and DGT device.



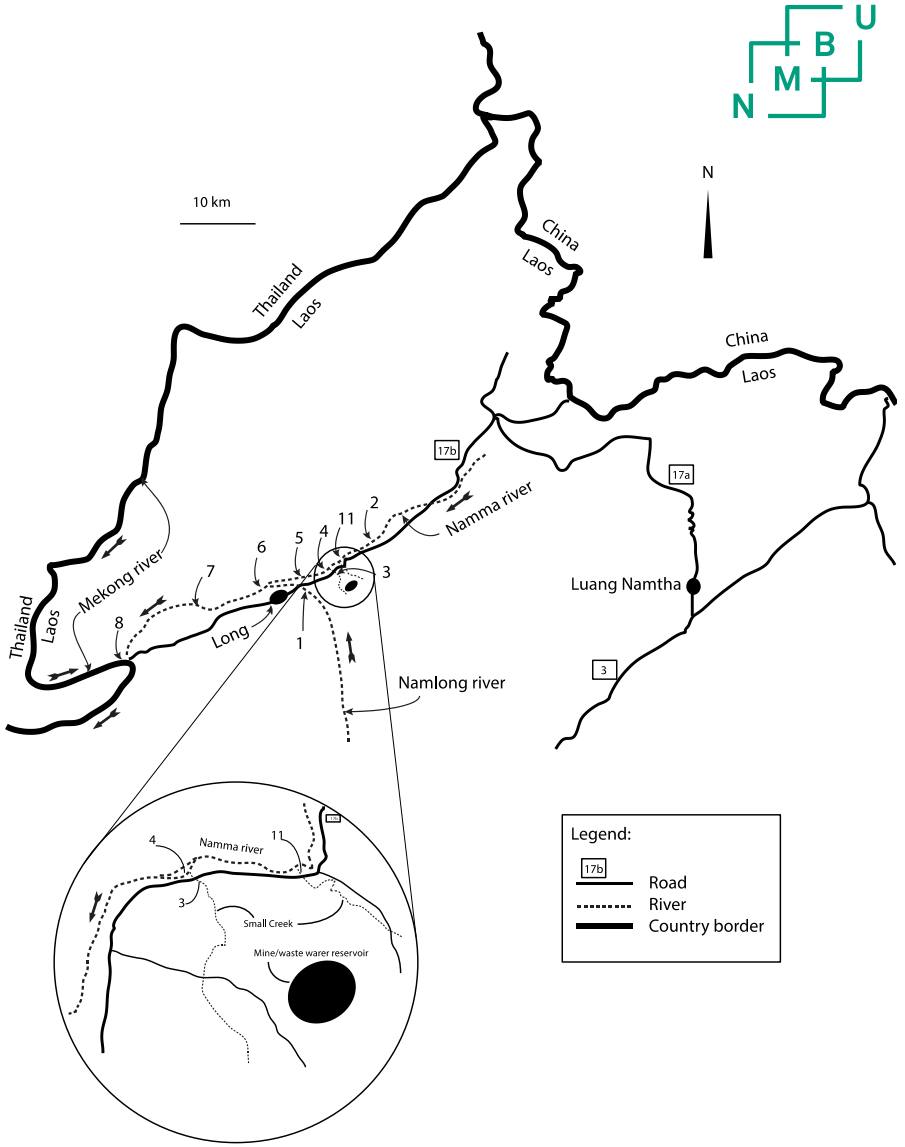

Replicated water samples, all elements without Al
µg/l
6
4
2
0
Site 1
Site 2
Site 3
Site 5
Site 6
Cr
Co
Ni
Cu
Zn
As
Se
U
Element

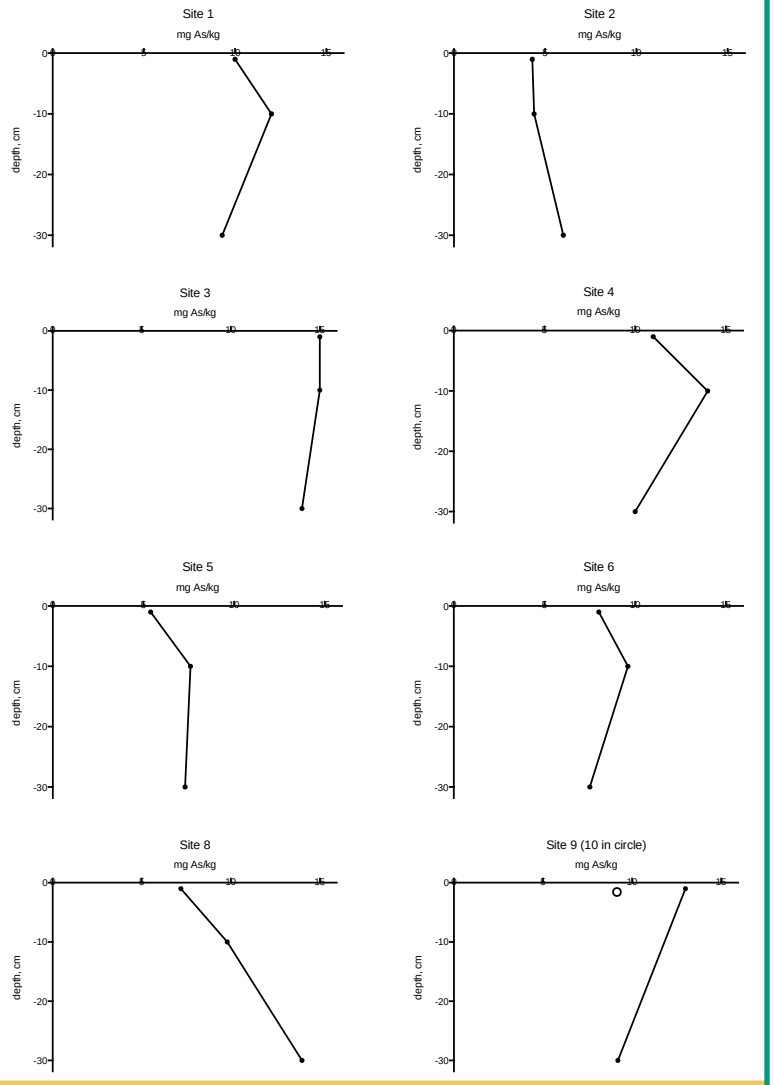

Site 1
mg As/kg
depth, cm
Site 2
mg As/kg
depth, cm
Site 3
mg As/kg
depth, cm
Site 5
mg As/kg
depth, cm
Site 6
mg As/kg
depth, cm

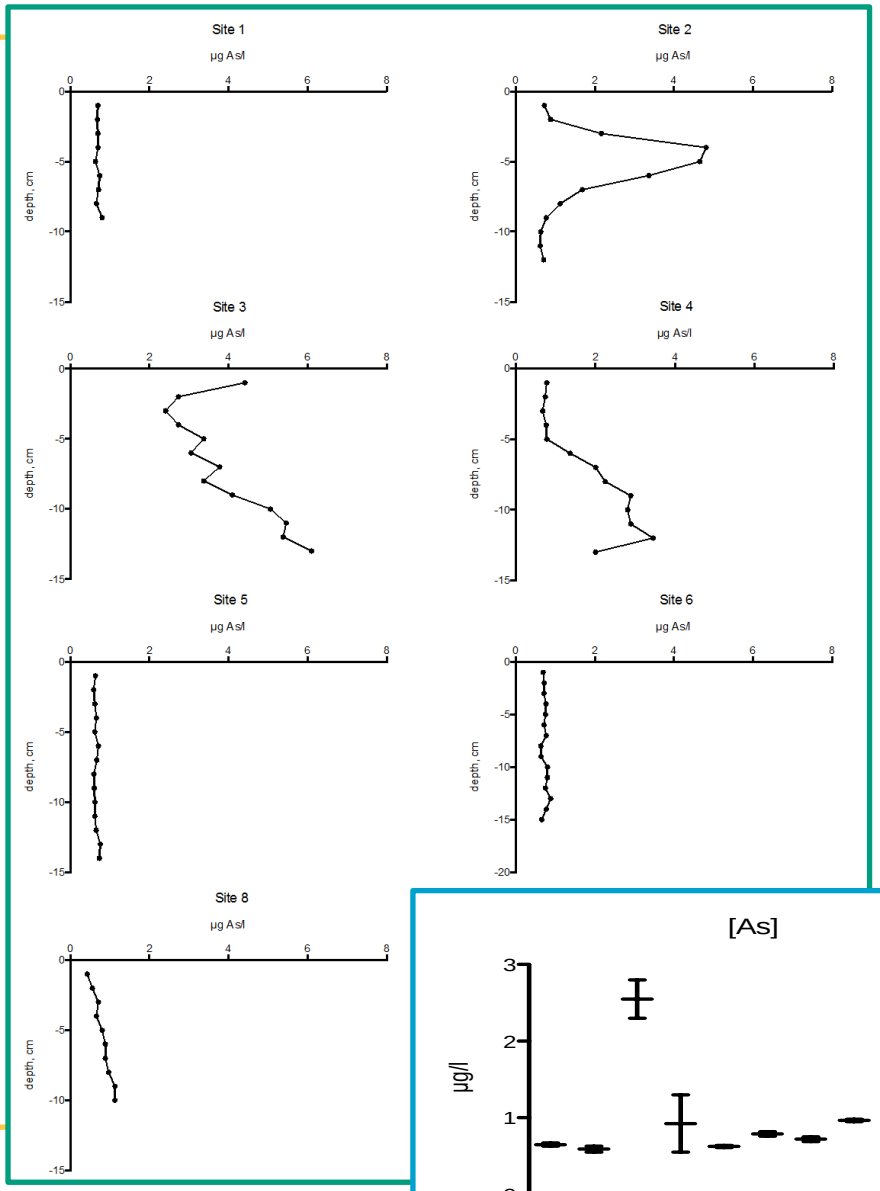

Site 1
µg As/l
depth, cm
Site 2
mg As/l
depth, cm
Site 3
mg As/l
depth, cm
Site 5
mg As/l
depth, cm

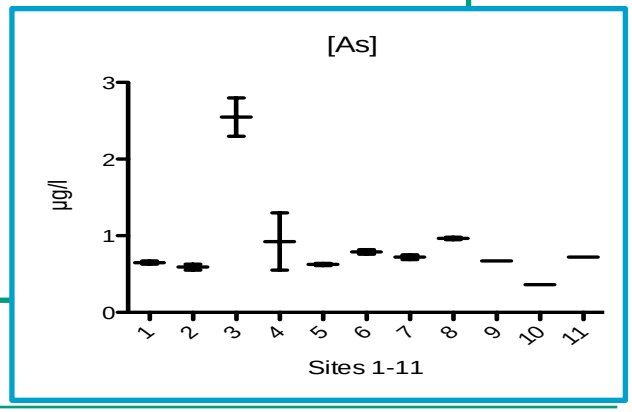

Laos


CHINA
BURMA
LAOS
THAILAND
VIETNAM
CAMBODIA
Hanoi
Vientiane
Phnom Penh
Bangkok
Gulf of Thailand
South China Sea
Andaman Sea
Thailand, Vietnam, Laos, Cambodia
International Boundary
Road
Minor Road
River
National Capital
City or Town
0 100 200 KM
0 100 200 Miles
©2007 Geology.com


10 km
N
Thailand
Laos
China
Laos
China
Laos
Mekong river
Namma river
Namlong river
Long
Luang Namtha
17b
17a
3
1
2
3
4
5
6
7
8
11
Small Creek
Mine/waste warer reservoir
Legend:
17b
Road
River
Country border


Site 1
mg As/kg
depth, cm
Site 2
mg As/kg
depth, cm
Site 3
mg As/kg
depth, cm
Site 4
mg As/kg
depth, cm
Site 5
mg As/kg
depth, cm
Site 6
mg As/kg
depth, cm
Site 8
mg As/kg
depth, cm
Site 9 (10 in circle)
mg As/kg
depth, cm


Site 1
µg As/l
depth, cm
Site 2
µg As/l
depth, cm
Site 3
µg As/l
depth, cm
Site 4
µg As/l
depth, cm
Site 5
µg As/l
depth, cm
Site 6
µg As/l
depth, cm
Site 8
µg As/l
depth, cm


[As]
µg/l
Sites 1-11


Takk for oppmerksomheten