The Afghan Papers - Part 17

Wed, 20 Jan 2016 16:00:00, newstips66, [category: afghanistan, post_tag: afghanistan-waste-exhibit-a-kajaki-dam, category: elon-musk, category: energy-dept-slush-fund, category: lithium-batteries, post_tag: lithium-ion, post_tag: more-than-300m-spent-and-still-not-done-a-senate-subcommittee-is-looking-at-waste-by-a-pentagon-task-force-it-would-do-well-to-review-the-reasons-why-a-major-hydroelectric-power-plant-sits-unfinishe, post_tag: tesla-hacked, post_tag: uncategorized, category: worldnews]

http://mom.gov.af/Content/files/MoMP_LITHIUM_Midas_Jan_2014.pdf

Lithium in Afghanistan

Figure 1. Lithium occurrences in Afghanistan on

a low

-

resolution

Landsat

image,

with major tectonic features, intrusive

rocks and saline lakes.

Geology of Afghanistan

Afghanistan has a complex geolog

y due to its position

o

n

the junction between the Indo

-

Australasian and Eurasian

crustal plates. Its geology is composed of a series of

terranes that broke away from the main Gondwana

supercontinent before coll

iding, with each other or

with

the Eurasian plate. Ultimately, all the terranes

became

accreted onto the southern margin of the

Eurasian plate.

The accretionary events started in the

Cretaceous and have

continued until recent times. The

final closure of the

Neo

-

Tethys

ocean between the Indo

-

Pakistan and Eurasi

an

plates caused the Himalayan

orogeny. In the Hindu Kush

region of NE Afghanistan
downward buckling of the
intervening crust and later
uplift of these metamorphosed
remnants produced high
-
grade metamorphic rocks
, anatexis
and
S
-
type
granites. Li
-
bearing pegmatites are in the
main,
restricted to Nuristan in NE Afghanistan
adjacent to
the Laghman granite complex (Figures 1
and 7).

Introduction to Lithium

Lithium, despite being called a ‘rare metal’, is not that
rare
in the Earth’s crust and its crustal average is about
35 ppm.
Until recently lithium has been used only in
small niche
markets in the glass and ceramics industry,
in high
temperature greases and in the chemical
industry.
Lithium
h
as now become an
important element in the
emerging, digital and
low
-
carbon
economy and lithium
batteries will probably power the
next generation of
electric cars, causing demand for
this ‘rare metal’ to grow
rapidly over the next 10 years.
A
t the present time
(2013
)
suppli

es are broadly in

balance with demand

.

But d

emand

is predicted by

many forecasters to exceed supply in 2020.

The two main sources of lithium are hard rock sources

in

pegmatites and in solution within continental brines,

both of

which are present in Afghanistan.

Figure 2. Location of the

lacustrine halite occurrences, lakes, main rive

rs and major faults on a shaded

relief background

from the USGS GIS (Peters et al., 2007).

The bulk

of the world's

supply

of lithium

comes from

salt

or playa lakes, also called 'salars' after their Span

ish name.

Afghanistan has similarities with the South American

deposits in the so

-

called 'Lithium triangle'

of Argentina,

Bolivia and

Chile

with

its

elevated enclosed

basins

, high

evaporation rates and, in some cases

,

young volcanic

rocks.

Lithium in Afgh

an Lake Sediments

Afghanistan has a number of

similar

lakes (
Figure
2).
Reconnaissance sampling
(Figure 3) by the Dep
artment of
Defense (DoD, 2011)
indicated high Li levels i
n lake
sediment (Table 1). The
lakes have not been syst
ematically
sampled for lithium
or other
potentially ec
onomic elements,
such as K, B,
Rb
, U
or Cs
,
so it is
not
possible
at present
to
give
any
estimates of resources. The readily available
figures are given by Abdullah et
al
.
(
1980).
Figure 3. The Afghanistan Geological Survey works in
partnership with international geo
-
scientific organizations
to produce a compelling assessment of Afghan resources.
Examination
of
known
salt
lakes (
Figures 4
-
6)
on
detailed
Landsat ETM+ images on the USGS GIS (Davis, 2007)

shows that

the water shows a blue reflec

tance and the area

of this reflectance has been taken as the present surface

area of the lake (Figure 4). White areas around the lakes

are pr

obably salt flats, but they could be gypsum, which

normally shows a light blue

color

on the 7

-

4

-

2 band image.

Table 1. Analyse

s of Afghan lake sediments from

reconnaissance sampling (DoD, 2011).

Lake

B

ppm

Na

%

Li

ppm

Sr

ppm

Mg

%

Chankansar

(Nimroz)

1.54

49

560

1.75

Dasht

-

e

-

Nawar

110

10.5

99

894

8.7

Gowde

Zareh East

110

25.1

36

358

1.7

Namakas

-

e

-

Herat

48

30.3

41

461

0.8

Crustal Abundance

9

2.27

18

384

2.8

The DoD team drilled to 10 metres at multiple location in

Namaskar

-

e

-

Herat (DoD, 2011). The team believes

samples were collected in the Halite zone, a key indicator

of correct sample location, and found signs of

hydrothermal activity at the site