

Presentation

South Caspian Basin - West Baluchestan, Middle East: On Alpine Magmatism, Tectonics, Metallogeny and Hydrocarbons (HC- Oil-Gas) Relation: Some Problems and Constraints

A Romanko^{1*}, NA Imamverdiyev², I Vikentev³, M Heidari⁴, B Rashidi⁵, A Savichev¹, A Poleshchuk¹ and A Kiselev¹

Annals of Earth Science and Geophysics

¹Geological Institute, RAS, Moscow, Russia
²Baku State University, Republic of Azerbaijan
³Institute of Geology of Ore Deposits, RAS, Moscow, Russia
⁴Pars Kani, Tehran, Iran
⁵Satrap Resources Co, Perth, Australia

We present some materials on this famous region - several structures of the Middle East. Such points could be noted as follows:

1. A very important north-eastern (NE) tectonic magmatic - metallogenic - Oil-Gas (or hydrocarbons - HC), at least, Miocene (N1) - Recent zoning exists in the region studied [1-3] (metallogeny led by E. Romanko et al). There are no doubts about mantle component important role (known delamination by M. Keskin, 2003 etc. and global African super Plume activity - ex - tomography by Bull, McNamara, Ritsema, 2009 etc.). It controls tectonics, intraplate magmatic, and fluid events etc. Such different zoning effects could be stressed as: Neogene - Recent (N1-Q) intraplate magma due to African superplume activity. Magma products are: subalkalinealkaline igneous rocks - Ca-rich igneous rocks - up to real Quaternary (Q) carbonatites of Hanneshin, Afghanistan. There are data about Sr, Ca etc. input in upper younger Caspian Sea sediments from the lower older magmatites. There is such magmatic trend as: Quaternary carbonatites, Hanneshin, Helmand block, Afghanistan - Ca-rich volcanites with CaO up to ca. 35% - Ca-rich volcanites with CaO up to 10% - trachyandesites with CaO 7%, W - Baluchestan.

2. Oligocene-Recent (Pg2-Q4) is **subduction-related** magma-antipode verus **intraPlate** one. There are some data about warmer subduction-related (trachyAndesites, rhyolites etc.) rocks here, ex., fairly warm melt (up to 1220 °C in non-basalts; H20 up to 9 wt% in Q-rhyolites, Bazman structure) inclusions in them [3].

3. Decreasing of earthquakes activity from the South to the Middle Caspian Sea, at least (Khain, Bogdanov, 2003 etc.). Also, famous Prof V. Khain, et al. in 2003 stressed HC decreasing from South Caspian Sea - to North Caspian Sea. 4. Oil - gas-condensate/gas **zoning** from the west to the east of the Caspian Sea and N. Persian Gulf. It could be in relation with NE superplume activity meaning such limit as Caucasus barrier, which limits HC moving to the northeast and rotates them to the east (Figure 1, Figure 2, Figure 3, Figure 4 and Figure 5).

5. **Other HC zoning** is as follows: HC in the old rocks, since Devonian up to Paleogene - **North** Caspian Sea vs. HC in Triassic-Jurassic, Paleogene rocks in the Middle Caspian Sea, and in Low Pliocene (N2) rocks - **South** Caspian Sea. It could be in agreement with northeastern superplume activity **decreasing**. Fairly rare coal - HC coexisting could be also in agreement with a long strong degassing in this geowarm region. It could be proposed that the age of all (or most) Caspian Sea HC is similar or maybe simply one despite regularly older HC-bearing layers to the north, as said above. Also, giant HC resources in Saudi Arabia - Caspian region could be related with the very African superplume activity. Important, that chemical data exist as: 800:1 for nonOrganic carbon vs organic carbon (by Prof Rudenko, MSU,Moscow; also for abiogenic - Prof Pikovsky, et al. MSU, having 1986

*Corresponding author: A Romanko, Geological Institute, RAS, Moscow, Russian Federation, Russia

Accepted: November 10, 2022

Published online: November 12, 2022

Citation: Romanko A, Imamverdiyev NA, Vikentev I, et al. (2022) South Caspian Basin - West Baluchestan, Middle East: On Alpine Magmatism, Tectonics, Metallogeny and Hydrocarbons (HC-Oil-Gas) Relation: Some Problems and Constraints. Ann Earth Sci Geophys 1(1):8-12

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Figure 1: Southern Caspian basin energy prospects. Oil-gas (OG) fields etc. are in agreement with Cenozoic tectonics. Induced seismicity is also registered in the region. US energy oil data.



Figure 2: North Iran - South Caspian-Middle Caspian basin (left to right). In Russian, sorry. Oil-Gas (HC) fields are in agreement with Cenozoic tectonics (Oil-Gas deposits as curve lines).





Figure 3: South Caspian important mantle anomaly. In Russian, sorry. West - East (left to right), after - Jackson, 1992 with adding by Astafiev, et al. 2017 [1].



successful prognosis for 5 HC-giants in S-America in 30-years). NonOrganic (abiogenic) HC could be related to organic one uniting of two possibilities (organic matter or OM-recycling by seismologist Rodkin, et al, 2014; Dmitrievsky, et al, 2016) [4].

6. All HC localization is in agreement with a regional general geology - no serious problem to explain a concrete fairly big HC field on the geological map. Deep H2 plus C from sediments give us CH4 without serious problems. Also, deep CO2 and even some CH4 could help in economic oil/ gas processes despite MAIN oil genesis is traditional (biogenic one with input of deep fluids etc.).

7. There is a fairly good correlation as detailed structural

map - HC (oil) maximum. It is in agreement with a young or very young concrete HC localization despite the any age of host rocks with these HC. Important that: Mud volcanoes -HC - Salt +- fauna? in the Caspian Sea region is ONE system (using also data of known V. Kholodov, et al. Moscow). All-Geo North - South zoning here is principal.

8. More data for discussion etc. are:

- The balance of hydrocarbons in time a spectacular and important argument, according to (Gold and Held, 1987; Selly 1998, using well-known materials by N.A. Kudryavtsev)
- A mixture of abiogenic and biogenic carbon in



Figure 5: South Caspian basin complex tectonics. In Russian, sorry. Blue - oil and gas fileds. Ovals - local uplifts.

vultures (HC yield) of Turkey, shown on the basis of impressive analytics, including the isotopy of carbon and oxygen. Foreign data on abiogenic hydrocarbons in Turkey (the coexistence of nonbiogenic and biogenic gases), India, etc. Recent and recent impressive data on Mars, the satellite of Europe (the presence of even ethane), distant planets, and many others. from space agency NASA, USA. However, apparently, there is no one chain of hydrocarbon gases - oil, these are two different branches (for example, Prof. Rudenko, chemical faculty of Moscow State University, etc.), although oil was artificially obtained from gas.

- The association of hydrocarbons with the mantle helium 3 isotope (although B. Polyak, et al. 2013 against a Biogenic genesis). Mixture of mantle helium 3 for mud volcanoes (muds) was established in connection with the active Cenozoic magmatism of the Greater Caucasus by O. Kikvadze, et al. 2016.
- Already banal finding gaseous hydrocarbons (up to butane) on other planets.
- Obtaining amino-acids from inanimate nature the famous experience of S. Miller, USA, 1951, etc. - a step to the emergence of life on Earth from inorganic compounds.

- A statement of organic compounds on the volcano Tolbachik, et al. Kamchatka according to E. K. Markhinin and V.V. Chelokov, et al. 1989. Methane output (there is data on ethane) in active volcanoes of Iceland, oil of the modern caldera Uzon, Kamchatka, for example, according to N.L. Dobretsov, et al. 2013 and many others. etc. (although formally opponents of deep oil admit capture of organic oil by magma). Quite numerous materials on underwater hydrocarbons (including abundant gas hydrates) in the oceans, for example, on O. Mazarovich and S. Sokolov, 2010, etc.
- Worldwide and famous works of A.I. Oparin, 1938 and many others. others about the origin of life etc.
- A substantial number of hydrocarbon deposits in the foundation, according to some data, at least 1/4 of all hydrocarbon deposits, ex. - materials of V. and N. Larin etc.
- Mechanism of the HC cycle and the proximity of the geochemistry of the lower (mainly) crust from the HC of a well-known seismologist, etc. M. Rodkin [4] allows unite' both - abiogenic and biogenic hypotheseis. It is known that the geochemistry of the rare elements of serpentinites (K. Ivanov, et al. 2017 [5] and many others), sometimes of the

lower and less often upper crust, has something in common with the geochemistry of oils. Purely abiogenic theory is not recognized by many major oil specialists. There are arguments for biogenic factor, but provoked by the often-known deep degassing (including the important hydrogen (H2), faults (which are known from the genius chemist D.I. Mendeleev ! etc.).

9. Of course, constructive criticism of the biogenic HC specialists is still very wanted. According to them, the following points remain problematic for the aBiogenic genesis, as (20 - 25 points):

There are purely biogenic HC-fields and peposits, there is no doubt about their origin.

Bio-markers are still a serious argument for biogenic HC despite discussion.

10. Materials of school of Prof. Vassoevich, MSU, et al. - while known Gold, et al. 1987 (abiogenic HC genesis) is not very accepted etc.

11. Volcano is able to throw away products with trapped organics. Organics in connection with volcanoes are formed, they say, extremely quickly.

12. HC recycling by known seismologist M. Rodkin, 2015 etc. (using Mesozoic - modern subduction while PZ one is not quite accessed) decrease maybe contradiction between bioand non Bio HC genesis [4].

13. Polymerization of methane until oil - is nonequilibrium and released only with catalysts. Oil has not yet been discovered on the planets, the role of organisms in the sedimentary cover is apparently significant.

14. Joint geo-analysis is of very importance, surely. It could help us with HC (oil...) and even in non-HC problems. Different HC young? zoning is in agreement with a young and mobilized' oil / HC fields. Oil fields age is maybe no more than 1 million-year-old and gas age is ca. Q4, due to deep oil conference: A.Timurziev et al., R.Seyful-Mulukov, A. and S. Marakushev, 2014-2019 [6-15] etc.

Authors Declaration

We are very grateful for the W-Baluchestan field to outstanding regional trio - Drs A. Houshmandzadeh, M.A.A. Nogole-Sadat (deceased), and E.LN. Romanko (deceased); also - to D. Astafiev, A. Kouzin, B. Golubov (deceased), M. Goncharov (deceased), et al., G. Gogonenkov, et al., Yu. Volozh, V. Bykadorov, M. Antipov, V. Trifonov, Yu. Leonov (deceased), V. Slavinsky, A. Kasimov, M. Hosseini et al.; also to the Lomonosov MSU for their known EAGE and other HC (oil-gas) lectures. Many our cordial thanks to the many geospecialists for long discussions, consultations and help.

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