

SODOM AND GOMORRAH AND PLATES TECTONIC

BERGOEING, Jean Pierre ^{a *}

(a) Phd in Geography. Professor of the University of Costa Rica, San Jose, Costa Rica. ORCID ID: <https://orcid.org/0000-0003-2079-6790>. CURRICULUM LATTES: https://www.researchgate.net/profile/Jean_Bergoeing

(*) CORRESPONDING AUTHOR

Address: Universidad de Costa Rica - San Pedro Montes de Oca, San José, Costa Rica. Tel: (+00) 50686290712
E-mail: jegadana@gmail.com

ABSTRACT

A Geomorphologic-tectonic study is done by the author about the destruction of Sodom and Gomorrah in the Death Sea. This has been a subject of several studies over the centuries. Bible studies that focus on scientific studies today. A geomorphologic approximation is carried out by the author determining the tectonic reasons that causes the destruction and disappearance of these cities.

Keywords: Tectonics, Sliding faults, Paleo-weather.

RESUME / RESUMEN

SODOME ET GOMORRHE ET PLAQUES TECTONIQUES

L'auteur a réalisé une recherche géomorphologique sur les causes de la destruction des cités antiques de Sodome et Gomorre sur les rives de la Mer Morte. Ceci a été l'objet depuis l'antiquité de recherches et d'études bibliques qui ont été poursuivies de nos jours par des études scientifiques. Une approximation géomorphologique est proposée par l'auteur arguant des raisons tectoniques comme base de cette destruction et effacement des cités.

Mots clés: Tectonique, failles de décrochement, Paléo-Climat.

SODOMA Y GOMORRA Y PLACAS TECTÓNICAS

El autor realizó un estudio geomorfológico sobre las causas de la destrucción de las ciudades de Sodoma y Gomorra, en las márgenes del Mar Muerto. Ello ha sido el objeto de estudios, desde la antigüedad, tanto bíblicos como científicos y particularmente en nuestros días. Una aproximación geomorfológica es propuesta por el autor sobre las causas tectónicas que causaron la destrucción y desaparición de estas ciudades.

Palabras claves: Tectónica, Fallas de transcurción, Paleo-Climas.

Article history:

Received 20 May, 2018
Accepted 6 June, 2018
Publisher 15 June, 2018

—

INTRODUCTION

The destruction of the cities of Sodom and Gomorrah described in the Bible has always been a subject of interest not only religious but also scientific. In fact, from a geomorphologic point of view, the place where these cities were found allows an analysis of this chaotic event that happened some 5,000 years ago.

According to the Biblical writings, Sodom, Gomorrah as well as Zebim, Segor and Adma were cities located in the southern sector on the shores of the Dead Sea near the Lisan Peninsula. Indeed the Dead Sea is a vast tectonic depression that is located between -118 meters to 378 meters (387ft to 1240ft) where the Jordan River flows, forming an endorheic basin of about 41,650 km² (16081sqm) of which the Dead Sea occupies about 810 km² (313sqm). (J.P. Bergoeing 2016)

Dead Sea naturally occupies the space of a tectonic depression, product of the slide and separation of the African and Arab plates sliding faults, which have produced an area of accretion where the magma of the upper mantle has come to cover the separate space product of the tectonic thrusts. During the Jurassic and Cretaceous, the sector was covered by the Mediterranean Sea and closes during the Miocene, when the Arabic plate collides with the Eurasian tectonic plate creating the current tectonic depression, as well as the mountains of Judea and Mount Carmel in Israel and It extends through the Golan Heights to Lebanon through the Antilebanon Mountains, to Syria. The culminating point is Mount Hermon of 2,814 meters (9,232.3ft) of altitude. In the Pleistocene, the future tectonic depression become free from the seawater of the previous geological periods, and the tectonic depression or grabben begins its process of sinking and subsequent filling with the waters of the surrounding rivers starting what will become the Dead Sea.

For Graham Brew (Brew et al. 2001) the Dead Sea transforming faults system was originated during the Neo-Tethys, with the collision of the African and Arab plates colliding with the European plate in Turkey giving rise to a Sinister transforming fault that moves to the South in the West strip, while the Eastern parallel plate is Dextral and moves Northward both in a distance of 107 km 66.5m. For these authors there are two important episodes; a first one, during the Miocene (displacement of the faults of 65 km (40,4m) and another in the Pliocene to our days (displacement of the faults in a distance covering 42 km (26.1m)).

THE DEAD SEA

From a Paleo-climatic point of view, the Dead Sea was desiccated about 125,000 years ago during the Riss-Würm inter-Glacial period, (Sangamonian in the US). Subsequently, the Lake decreased its surface during the Holocene, since 12,000 years ago, at the end of the Würm glaciation, (Wisconsin in the US), both for climate changes and for human settlements in its outskirts, having extracted water for agriculture and consumption Staff thus starting the salinity conditions that we know today.

Thus is how the international team of scientists, with Professor Emi Ito of the University of Minnesota, and Steven Goldstein of the Lamont-Doherty Terrestrial Observatory of Columbia University, in the United States, carried out a perforation under the Dead Sea bed 275 meters deep. The inner strata of the sample, of a thickness of 230 meters, show evidence of the drought periods of this lake sector during the Paleo-climatic periods of aridity already described and that reach some 200,000 years. (MORDECHAI et al 2011)

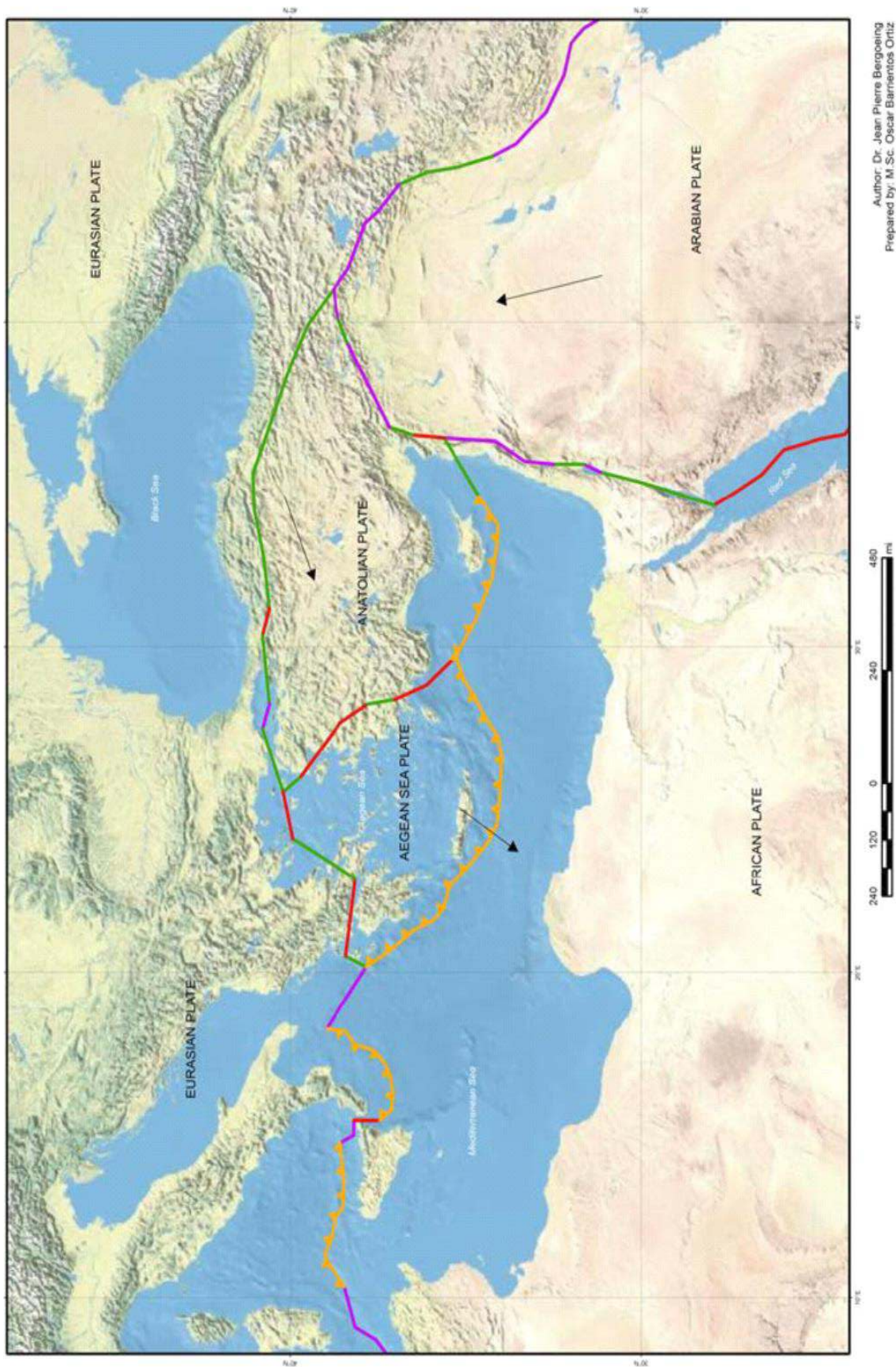


Figure 1 - African and Arabian tectonic plates colliding with the European plate, and forming a system of sliding tectonic faults. The Arabian plate slides North as the African plate makes it Southward. The Red Sea was formed during the Miocene and an important volcanism characterizes the western sector of the Arab Peninsula during the Pleistocene. In this figure lies the Dead Sea which is a tectonic depression product of the African and Arab plates. (BERGOEING, 2016).

Tectonic elements (left) and shaded relief of the topography (right) of the Dead Sea Transform.

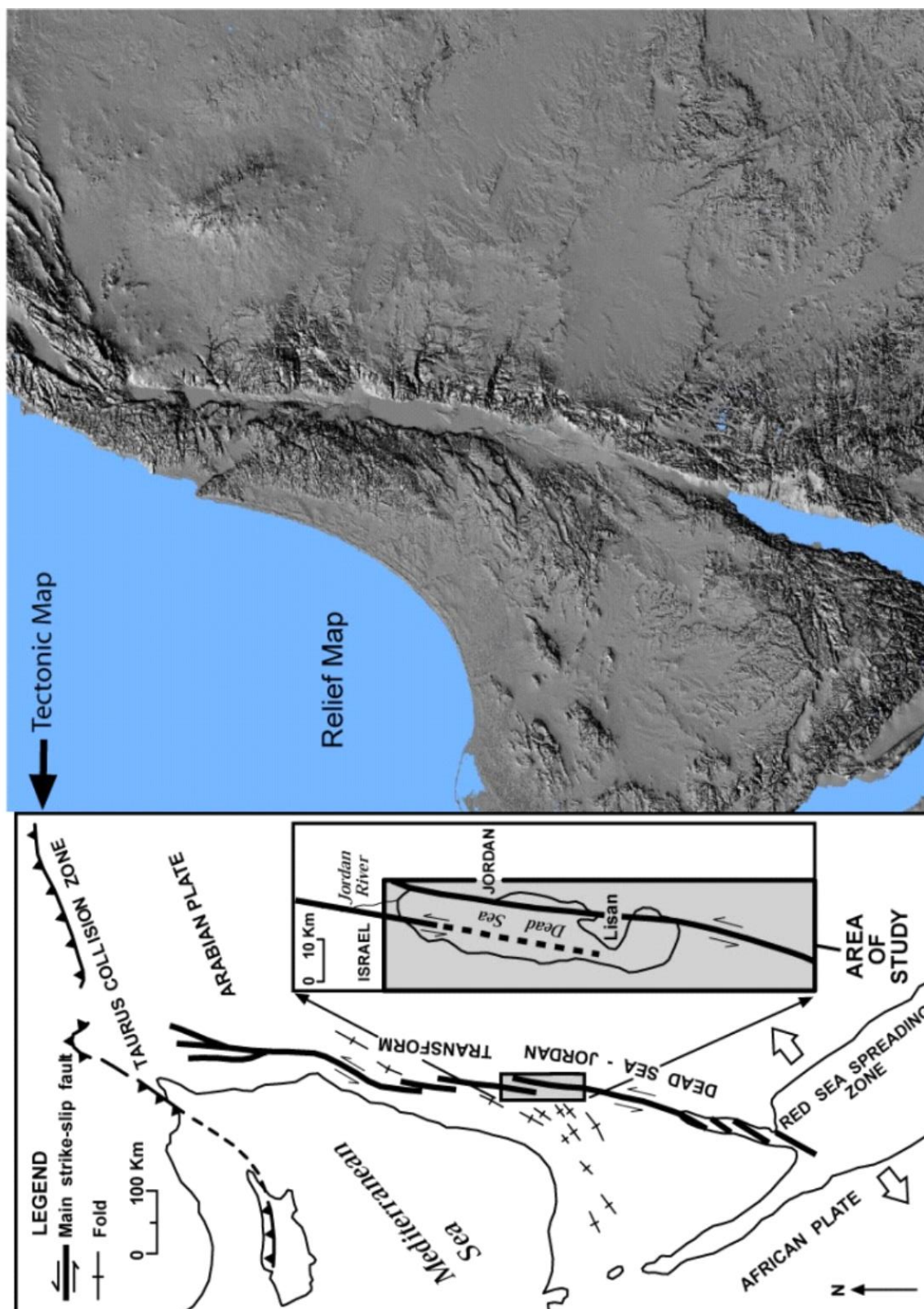


Figure 2 - Dead Sea tectonic area sector of the sliding African and Arabic plates, which has resulted in a tectonic depression occupied in part by the Dead Sea. (Tectonics and Geology of the Dead Sea. <https://woodshole.er.usgs.>)

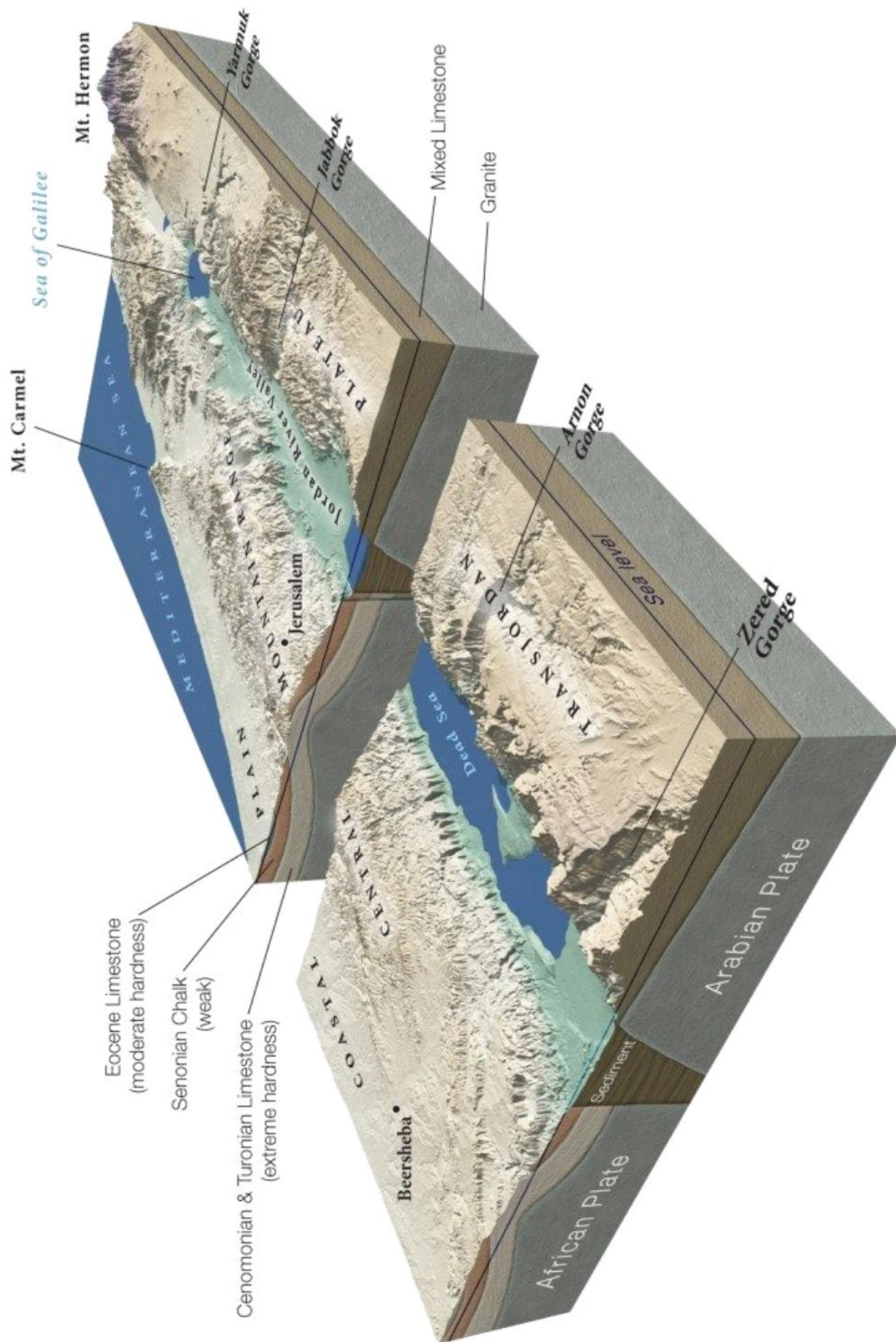


Figure 3 - Geological cut of the Dead Sea, located in a Miocene tectonic depression and resting on a base of granite and basalts on which more recent calcarous sedimentary rocks overlap. The Western bleed fault moves Southward while the eastern transforming fault is headed North. (Hernán Toledo, 2016.)



Figure 4 - Dead Sea, seen from Jordan. Waters are descending 1 meter per year. Photo: Kevin Connolly BBC. June 17th, 2016.

THE BIBLE STORY

Genesis 19, (new NIV International Version) describes the destruction of Sodom and Gomorrah punished by God for their sins, with a rain of fire and sulfur fallen from the sky that destroying these cities and all its inhabitants as well as the surrounding vegetation : 23 “Lot came to Zoar when it was dawning. 24 then the Lord caused a rain of fire and brimstone to fall from the sky over Sodom and Gomorrah. 25 thus destroyed these cities, and all their inhabitants, along with all the plains and the vegetation of the ground. 26 But Lot’s wife looked back, and was turned into a statue of salt. “

ARCHAEOLOGICAL DISCOVERY OF SODOM?

The American archaeologists’ team of the Trinity University of New Mexico, directed by Professor Steve Collins, (COLLINS 2013) has been working for ten years in the sector of Tel El-Hammam, in the Jordan Valley and has published in Popular Archaeology the results of the Discovery of the ruins of Sodom. It would date back to the Bronze Age about 3500 years ago. The site would have revealed two urban strata, one high and the other low surrounded by an adobe wall of

about ten meters high, with towers and access doors. It is also evident that the city had an abrupt end after 700 years of existence. Collins places Sodom in Tel El-Hammam, in Jordan, 14 km (8.7m.), north of the mouth of the Jordan River. The city would have been destroyed in the 18th century BC.

However Professor Eugene H. Merrill (MERRIL, 2012). disagrees with the identification of Sodom in Tel El-Hammam as it opposes the biblical chronology. In reality Sodom, Gomorrah as well as Zebím, Segor and Adma were cities, located in the South sector on the shores of the Dead Sea, near Lisan Peninsula, and therefore does not agree its location with Tel El-Hammam

THE DESTRUCTION OF SODOM AND GOMORRAH

Without opposing the biblical account of divine punishment this might well have occurred using the Earth's forces that characterize the place. So it would not be strange that a revival of the sliding tectonic faults of the sector, with separation of them, have allowed rise magma something similar to the zone of the Atlantic accretion area which has given rise to volcanic islands like Iceland, for example. In the case of the Dead Sea, the fall of "fire and sulfur" described in the biblical account would be a volcanic eruption mostly gaseous of pyroclastic flows and sulfur, which put an end to all the inhabitants of this great Tectonic-Lake depression for its sudden and unpredictable speed. It should be noted that in this sector there are two tar fields, also known as the Judean bitumen.

However Professor John S. Lewis Emeritus Professor of planetary science at the University of Arizona postulates the theory, published in his book "Rain of Fire and Ice: The very real treat of Comet and asteroid Bombardment" (LEWIS, 2012) that Sodom, Gomorrah and the Adjacent cities were destroyed by a cosmic bombardment. The rain of fire and sulfur fallen from the sky can be the fall of a meteorite. In this case it's necessary to find tektites traces, but till now, they are absent from the soil.

Finally we can quote British scientist Graham Harris (2001) who explains the destruction of the Biblical cities of Sodom and Gomorrah due to the outbreak of flammable methane bags that are in the subsoil and that would have been expelled by the Earthquake occurred 4500 years ago.

FINAL CONSIDERATIONS

It is clear that the destruction of Sodom and Gomorrah from a religious or biblical point of view could be more consistent with destruction by an asteroid directed directly to that place by the hand of God. However, a sudden cracking eruption of the volcano-gaseous pyroclastic type flows (also known as burning Clouds), by reactivation of the sliding faults sector cannot be abandoned and is more plausible because the area is subject to the Plate tectonics movements that still being active in that sector till today.

Recent studies carried out in the Dead Sea sector in particular by Professor Mustapha Meghraoui of the University of Strasbourg, France, (MEGHRAOUI, 2015) have shown that throughout the centuries devastating earthquakes have affected the sector Highlighting those of the years 551, 1157, 1170, 1202, 1408 and 1837. This makes it possible to affirm that this sector is highly seismic and that Sodom and Gomorrah cities built with Adobes did not resist this type of seismicity. (MASSON et al. 2015). Nor is it excluded that pyroclastic flows from the mantle may have emerged through these tectonic failures.

Further South, the Western sector of the Arabian Peninsula, on its coastal side, is formed by a series of Pleistocene and Holocene, very recent volcanoes. Even Mecca, is seated on Holocene volcanic cones, which shows that this large sector that starts in northern Syria and whose prolongation is the African Rift has important and current tectonic and volcanic sequences. (BERGOEING 2012).

BIBLIOGRAPHIC REFERENCE

- BERGOEING, Jean Pierre. **Geomorphology and volcanology of Costa Rica**. New York: Elsevier Edit, 2017
- BERGOEING, Jean Pierre. **Tectonic Plates of the world**. Madrid: Edit. Artgerust., 2016
- BERGOEING, Jean Pierre. Tectónica de placas y vulcanismo en el área del Gran Rift. **Revista Mercator**, Vol. 11, N° 26. pp. 171-182. Fortaleza: 2012.
- BODECHTEL, Johann; Frei, Michaela; Wever, Tobias; Kauffmann, Hermann, Ye, Xia; Beyth, Michael. **Geology and tectonics concerning the Dead Sea rift Israel**. eesa earthnet online. European Space Agency, 2014.
- COLLINS, Steven. Steven Collins, HYPERLINK. <http://trinitysouthwest.com/steven-collins-dmin-prof-biblical-studies-apologetics> Trinitysouthwest.com. Retrieved 1 August 2017.
- COLLINS, Steven. Tall el-Hammam Is Still Sodom: Critical Data-Sets Cast Serious Doubt on E. H. Merrill's Chronological Analysis. **Biblical Research Bulletin** 13, no. 1 (2013): 1–31, 2013.
- GRAHAM, Harris. Un científico halla una explicación geológica a la destrucción de Sodoma y Gomorra **Ciencia/Ecología**. El mundo.es 20 agosto 2001.
- GRAHAM, Brew; JACEK, Lupa; MUAWIA, Barazangi; TARIF, Sawaf; ANWAR, Al-Imam; TAREK, Zaza. Structure and tectonic development of the Ghab basin and the Dead Sea fault system, Syria. **Journal of the Geological Society**. London Vol.158, 2001, pp. 665–674. Printed in Great Britain.
- LEWIS John S. **Rain Of Iron And Ice: The Very Real Threat Of Comet And Asteroid Bombardment** (Helix Books) Revised ed. Edition, 2012.
- MASSON, Frédéric, HAMIEL, Yariv, AGNON, Amotz, DEPREZ, Aline. Variable behavior of the Dead Sea Fault along the Southern Arava segment from GPS measurements. *Comptes Rendus*. **Geosciences**, 2015.
- MEGHRAOUI, Mustapha. Paleoseismic History of the Dead Sea Fault Zone. **Encyclopedia of Earthquakes Engineering**. Springer-Verlag, Berlin Heidelberg 2015.
- MERRILL, Eugene H. Texts, Talls, and Old Testament Chronology: Tall Hammam as a Case Study. **Artifax** 27, no. 4 (2012): 20–21, 2012.
- STEIN, Mordechai; BEN-AVRAHAM, Zvi; GOLDSTEIN, Steve; AGNON, Amotz; ARISTEGUI, Daniel; BRAUER, Achim; HAUG, Gerald. Ito Emi and Yasuda Yoshinori 2011. Deep Drilling at the Dead Sea. **Scientific Drilling** N°11 March 2011.
- TOLEDO, Hernán M. **El Mar Muerto está Reviviendo ¿Se cumplirá pronto la Profecía?** Breaking Israel News 2016.