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REVIEW

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The Sea in the Middle of Lands

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The Mediterranean Sea is situated between the continents Europe, North Africa and Western Asia. The average depth of the sea is about 1500 m. Its greatest depth is a bit over 5000 m off the coast of Greece and its total area is about 2.500.000 km^2. This area includes the Sea of Marmara but excludes the area of Black Sea which is about 970.000 km^2.

Figure. 1 Mediterranean Sea and countries that border the Mediterranean (source:www.worldatlas.com).

Mediterranean is connected to Atlantic Ocean by Gibraltar Strait, a shallow channel about 14 km wide, between Morocco and Spain, to Black Sea through the strait of Bosporus and to Red Sea by men-made Suez Channel at the southeast. The sea can be considered relatively closed since water interchange through these channels is not as much compared to its volume. The shallowest region, the Strait of Sicily lying between Tunisia and Sicily divide the sea into western and eastern sub regions, being 0.85 and 1.65 million km^2 respectively.

The south shores of the sea along North Africa and Asia are rather arid throughout the year and the water temperatures are high, whereas the north coasts along South Europe is somewhat mountainous and gets some rain during winter months. The seawater temperature varies between 10 - 27^{0}C, being higher in eastern region. Significant amount of evaporation occurs in eastern region because of its closed structure and hot climate especially during summer months, which causes high salinities and low water levels compared to the western part of the sea. Hence the cool and low saline waters of Atlantic moves into the western part and gets warmer and saltier. As the water moves towards eastern part where it sinks, circulates the west part and exits to Atlantic.

The basin has been under influence of human for about 8000 years. World population is projected to reach 10 billion in 2050. Today with 21 riparian countries around it, Mediterranean is home for about 500 million people and is visited each year by nearly half of this population for touristic purposes (Carella and Prant, 2014).

Having 12.000 species with high level of endemism, Mediterranean Basin is one of the

biologically richest and complex regions on Earth (Myers et al., 2000). Among the 519 species of sharks, rays and bony fish living in Mediterranean 74 species are endemic. The sea is considered as being richer in terms of species diversity then those–of Atlantic coasts which, decrease from west to eastern parts of the sea (Bazairi et al., 2010; Coll et at, 2007). Endemic *Posidonia oceanic*a seagrass provides a unique secure habitat for many species especially for fish. Mediterranean is also a home for many emblematic species such as green turtle (*Chelonia mydas*) Mediterranean monk seal (*Monachus monachus*).

Due to ever increasing human population, the basin is exposed to heavy environmental stress such as excess freshwater usage, overfishing, pollution, chemical and petroleum spills due to marine accidents. And also due to increasing coastal development by the construction of hotels and holiday houses on deforested coastlines. In addition to the above-mentioned direct anthropological pressures, global warming has a pronounced effect on sea water warming which in turn affects the numbers, abundance and distribution of species.

The Mediterranean basin has been identified as one of the two most responsive regions to climate change globally. It has been reported that 925 alien thermophilic species have entered Mediterranean through Suez Canal and many of them established permanent populations (Galil, 2007). Some of them are dispersing towards western parts of the sea. These aliens and lessepsian species which entered Eastern Mediterranean from Red Sea and Indian Ocean are accepted as a major threat to native populations and biodiversity which covers diversity within species, between species and of ecosystem (Galil, 2009; UNEP-MAP-RAC/SPA, 2011). The loss of *Posidonia oceanic*a habitat to exotic invader *Caulerpa taxifolia* from Australia, resulted a big decrease in biodiversity.

Capture fisheries and aquaculture are important features of the Mediterranean Sea with significant socio-economic role in the region. According to FAO data sets and General Fisheries Commission for the Mediterranean (GFCM) figures, capture fisheries production from Mediterranean region (including the Black Sea) was over 1 300 000 tones in 2015. Aquaculture sector has shown a rapid growth in the region and production in 2015, is estimated by FAO as 2 442 000 tones in volume and US$ 6 053 000 000 in value. Based on data published by GFCM, 48.9% of the catches in the Mediterranean basin come from Herrings, Sardines and Anchovies while 11.5% is composed of coastal fish species. Mullets, sea bass and sea bream are the most common marine species cultured in the region. Promoting sustainable capture fisheries and aquaculture activities and responsible practices within the ecosystem approach are of crucial importance for contribution of these sectors to socio-economic development of the region.

Today a number of conservation programs concerning the protection of climate and habitats of Mediterranean are carried out to preserve its biological integrity (MAP, 1975; FMI, 2009; UNEP, 2017). In 1975 “The Barcelona Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and its Protocols” of UNEP was adopted for the first time and the second phase of Mediterranean Action Plan was adopted in 1995 by the 21 countries around Mediterranean and European Union (UNEP, 1995; IUCN(a); IUCN(b); Otero et al., 2013). These regional initiatives need to be further promoted and strengthened by appropriate strategies and policies to

preserve the natural heritage of the Mediterranean Sea.

References

Bazairi, H., Ben Haj, S., Boero, F., Cebrian, D., De Juan, S., Limam, A., ... & Rais, C. (2010). The Mediterranean Sea Biodiversity: state of the ecosystems, pressures, impacts and future priorities. *UNEP*. Tunis, 1-100.

Carella, M., Parant, A. (2014). Demographic trends and challenges in the Mediterranean. *South-East European Journal of Political Science (SEEJPS)*, 2(3), 10-21.

Coll, M., Piroddi, C., Steenbeek, J., Kaschner, K., Lasram, F. B. R., Aguzzi, J., ... & Danovaro, R. (2010). The biodiversity of the Mediterranean Sea: estimates, patterns, and threats. *PloS one*, 5(8), 1 - 36.

FMI, (2009). Flanders Marine Institute. Effects of climate change on the Mediterranean. Retrieved from http://www.vliz.be/wiki/Effects_of_climate_change_on_the_Mediterranean

Galil, B. S. (2007). Loss or gain? Invasive aliens and biodiversity in the Mediterranean Sea. *Marine Pollution Bulletin*, 55(7), 314-322.

Galil, B. S. (2009). Taking stock: inventory of alien species in the Mediterranean Sea. *Biological Invasions*, 11(2), 359-372.

IUCN(a). International Union for Conservation of Nature. Mediterranean Marine Programme. Retrieved from https://www.iucn.org/regions/mediterranean/our-work/mediterranean-marine-programme

IUCN(b). International Union for Conservation of Nature. Climate change in the Mediterranean. Retrieved from https://www.iucn.org/regions/mediterranean/our-work/climate-change-mediterranean

MAP (1975). Mediterranean Action Plan. The Barcelona Convention. Retrieved from http://ec.europa.eu/environment/marine/international-cooperation/regional-sea-conventions/barcelona-convention/index_en.htm

Myers, N., Mittermeier, R. A., Mittermeier, C. G., Da Fonseca, G. A., & Kent, J. (2000). Biodiversity hotspots for conservation priorities. *Nature*, 403(6772), 853-858.

Otero, M., Garrabou, J., & Vargas, M. (2013). Mediterranean Marine Protected Areas and climate change: A guide to regional monitoring and adaptation opportunities. *IUCN, Malaga, Spain*.

UNEP, (2017). United Nations Environment Programme. Contracting Parties. Retrieved from http://www.unep.org/unepmap/

UNEP,(1995). United Nations Environment Programme. The Convention for the Protection of the Mediterranean Sea Against Pollution. Retrieved from, http://www.ypeka.gr/LinkClick.aspx?fileticket=30r%2B7BeaSOo%3D&tabid=406&language=el-GR

UNEP-MAP-RAC/SPA. (2011). Non-native species in the Mediterranean: What, when, how and why? Ed: RAC/SPA, Tunis. 28 pp.