

The countries bordering the Arabian Gulf are: Iran, Iraq, Kuwait, Saudi Arabia, Qatar, Bahrain, the United Arab Emirates and Oman. The countries bordering the Mediterranean Sea are: Spain, France, Monaco, Italy, Malta, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Albania, Greece, Turkey, Cyprus, Syria, Lebanon, Palestine, Israel, Egypt, Libya, Tunisia, Algeria and Morocco. The countries bordering the Red Sea are: Egypt, Israel, Jordan, Sudan, Eritrea, Saudi Arabia, Yemen and Djibouti.

2.1. Arabian Gulf (AG)

The Arabian Gulf is a shallow semi-enclosed marginal sea, with less than 100 m in depth over its entire extent and with a mean of only 35 m (Reynolds R.M., 1993). It covers an area of about 240,000 km², with 1000 km in length and widths ranging from 185 km to 370 km, with a mean of 240 km. The volume is approximately 8,400 km³. There are freshwater inflows from the Tigris, the Euphrates, and the Karun at the delta of the Shatt al Arab, estimated at 0.2 m/yr, in which fresh water and river inflow equals 48 km³/yr (Reynolds, 1993; Hunter, 1986). The mean annual evaporation rate is estimated at approximately 1.5 m/yr (Brewer & Dryssen, 1985).

The shallowness of the Arabian Gulf water leads to the formation of a very high saline and dense water, with maximum salinities as high as 57 g/l along the southern coast (John et al., 1990). Typical mass transport by the outflow from the Arabian Gulf has been estimated to be about 34.5×10^9 m³/day, which is larger than that reported by other studies (Bidokhti & Ezam, 2008). Ahmad and Sultan (1991) employed the Knudsen relations and estimated that the annual mean Gulf water outflow transport was about 14.7×10^9 m³/day, compared to the observation of an annual mean of $(17.3-21.6) \times 10^9$ m³/day from an Acoustic Doppler Current Profiler (ADCP) in the Strait of Hormuz (Bower et al., 2000).

The largest number of desalination plants can be found along the shores of the Arabian Gulf with a total seawater desalination capacity of approximately (45%) of the worldwide daily production. The main producers in the Gulf region are the United Arab Emirates, Saudi Arabia (9% from the Gulf region and 13% from the Red Sea), Qatar and Kuwait (Lattemann & Höpner, 2008; Wiseman, 2006). There are about 1,500 desalination units operating in the Arabian Gulf countries, which account for 58% of the world desalination production (Al-Mutaz et al, 1989). The brine percentage discharged to the Arabian Gulf from the Iraq desalination plant is not clear to me but I estimate it to be about 5%.