

# **Genesis, Compositions, Source Areas; Trajectories, Frequencies, HSE Risks and Impacts of Sand and Dust Storms (SDSs) on Energy Operations in Arabian Gulf Countries**

Target Exploration Report Tar141



## The Report

This is an original statistical modelling and interpretation study of more than six decades of Arabian weather stations' records to model source areas, compositions, seasons, intensities, frequencies, trajectories, erosion and depositional environments of Sand and Dust Storms (SDSs) and Dangerous Sand and Dust Storms (DSDSs) impacting [Iran, Iraq, Jordan, Kuwait, Syria and Arabian Gulf Countries](#).

The report is a documentation of data, results, conclusions and recommendations of an in-house research that calibrated, integrated and interpreted historical with recent weather records of Kuwait and adjacent areas against recent dust storms studies in terms of seasons, numbers, frequency and intensity of sand and dust storms. The report concluded that:

- Sand and Dust Storms (SDSs) are increasingly impacting the Arabian Gulf and Arabian Gulf countries, causing HSE concern, damaging petroleum and renewable energy gears; and interrupting energy exploration, production and exporting operations.
- Aside from the serious HSE risks and pollution; any company operating, providing technical services or planning to work safely in Iran, Iraq, and GCCs must understand and plan for crisis management procedures, lost workdays and protection methods from dangerous dust storms that are progressively increasing Arabian Gulf Countries.
- The report outlines the HSE measures and countermeasures for surviving and mitigating the risks and human and material losses triggered by Dangerous Sand and Dust Storms (DSDSs).

## Recent Sand and Dust Storms (SDSs) in MENA

Sand and Dust Storms can be classified into: Haze (Suspended Dust), Rising Dust, Dust and Dangerous Dust Storms. Generally, they have been increasing in number, intensity, seasons and frequency in the Middle East and North Africa, and causing serious HSE concern, damaging petroleum E&P equipment; interrupting energy exploration, production and exporting operations, and reducing the productivity and efficiency of renewable energy projects. Recent examples of some dangerous dust storms in the Arabian Gulf are:

1. A single dangerous dust storm like the one that impacted Syria, Iraq, Iran, Kuwait and other Arabian Gulf countries during 19, 20, 21 and 22 June 2008 left a trail of deaths, sickness and destruction, in which: eight tankers prevented from loading oil from

northern Arabian Gulf terminals, land and air transportation were severely disrupted; many traffic accidents were reported during 19<sup>th</sup> and 20<sup>th</sup> of June, 150 individuals admitted to hospitals in Bahrain only.

2. During the 25<sup>th</sup> February 2012 dust storm that hit Riyadh, several fatal highway pileups were reported, and 900 individuals were hospitalised due to respiratory problems.
3. Following a 108 Km/Hr dusty thunder storm on 25<sup>th</sup> November 2016, some 844 severe asthma attack cases reported to emergency departments, 26 cases admitted to intensive care, 45 cases admitted to hospital wards for treatment, and 5 cases of severe asthma attacks died in the public hospitals of Kuwait during 29-30<sup>th</sup> of November 2016.

**Companies operating in, Gulf Cooperation Countries, Iran, Iraq, Oman, Saudi Arabia and Syria and may utilise the statistical analysis of this report for predicting frequencies and intensities of SDSs and DSDSs in order to:**

- Understand Sand and Dust Storms (SDSs) source areas, geneses, compositions, frequencies, intensities, trajectories and impacts on HSE, and GeoEnergy operations in the Arabian Gulf countries.
- Identify the healthiest and least affected locations by SDS locations for your offices, drilling sites, pumping and gathering stations, solar, wind, geothermal and other renewable energy farms.
- [Estimate lost-work-days when planning](#) for weather-sensitive operations and activities in the Arabia Gulf Countries.

## **Publications**

**Ibrahim, MW. (2012).** Long-term Predictability and Impact of Dust Storms on E&P in Iraq and Gulf Countries, Iraqi Petroleum Conference 2012, Organised by Target Exploration Consultants, September 2012, Imperial College, London, UK. [IPC12](#)

**Ibrahim, MW. (2015).** Frequency and impact of sand and dust storms on Arabian Gulf Oil & Gas operations, MENA 2015 Oil & Gas Conference, Organised by Target Exploration Consultants, September 2015, Imperial College, London, UK. [MENA15](#)

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This report identifies the source areas, genesis, compositions, trajectories, intensities and frequencies of sand and dust storms over Iran, Iraq, Kuwait, and other Arabian Gulf Countries since 1957. It is in 24 pages of text, 40 maps and figures, and 6 appendices. The report is only available from:

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