



Qatar Peninsula's vulnerability to oil spills and its implications for the global gas supply

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More than 20% of global liquefied natural gas (LNG) exports and almost all of Qatar's drinking water production originate from three industrial sites within a few tens of kilometers on the eastern coast of Qatar's peninsula. However, with the observed regional increase in maritime transport accidents, the vulnerability of those sites to major oil spills remains largely unquantified, let alone understood, due to complexities in forecasting and containing pollution in such shallow waters and harsh hyper-arid environments. To address this deficiency, we model the oil spill dispersal in the shallow maritime waters surrounding Qatar's peninsula to identify which offshore areas and times of the year pose the most significant threat to both LNG export and seawater desalination facilities. By combining the outcome of our oil transport simulations with marine traffic data, we identify two high-risk areas, sizing up to ~15% of Qatar's maritime exclusive economic zone, where the elevated oil pollution exposure is concentrated and can cause major disruptions to the above facilities. Our results suggest that the major LNG liquefaction terminal of Ras Laffan has the highest vulnerability to oil spills among all studied sites all year long. Moreover, the desalination plant to the North of Ras Laffan, producing 30% of the national water supply, has a seasonal vulnerability peaking up to an alarming level twice a year during spring and fall. The two other desalination plants located southeast of the peninsula have a lower vulnerability all year long. Furthermore, both LNG export and desalination facilities are found to be highly vulnerable to oil spills occurring outside of Qatar's maritime borders, which could land in these vital infrastructures in less than two days. These delays are further reduced when considering the spill's arrival time near coastal waters shallower than 5 m depth, which are inaccessible to several large containment vessels. Therefore, we suggest that those two offshore high-risk areas be closely monitored with airborne and orbital SAR observations, providing early warning for oil spills that can severely disrupt the LNG exports from Ras Laffan, further aggravating the global gas crisis.

Reference:

Anselain T., E. Heggy, T. Dobbelaere and E. Hanert (2023) Qatar Peninsula's vulnerability to oil spills and its implications for the global gas supply, *Nature Sustainability*, in press, <https://www.nature.com/articles/s41893-022-01037-w>

