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Environmental impact assessment of oil production and transportation in Caspian Lowland and Ustyurt Plateau in Kazakhstan using remote sensing and GIS modelling tools

Marat Karatayev (1,2), Asima Koshim (3), William Nock (4), Michele Clarke (2,5)

(1) Institute of Systems Sciences, Innovation and Sustainability Research, Ernst Mach Partnership Programme, University of Graz, Graz, Austria (Marat.Karatayev@uni-graz.at), (2) Energy Technologies Research Institute, The University of Nottingham, Nottingham, United Kingdom, (3) Department of Cartography and Geoinformatics, School of Geography and Environmental Management, Al-Farabi Kazakh National University, Almaty, Kazakhstan (Asima.Koshim@kaznu.kz), (4) Department of Chemical Engineering and Biotechnology, University of Cambridge, Cambridge, United Kingdom (wn226@cam.ac.uk), (5) School of Geography, The University of Nottingham, Nottingham, University Park, United Kingdom (Michele.Clarke@nottingham.ac.uk)

Caspian Sea countries are rich in energy resources and historically some of the world's leading producers and exporters of oil resources. The potential oil resources in Caspian Sea region are estimated to be over 300-350 billion barrels of oil reserves. Kazakhstan, Russia and Iran are the largest countries in terms of oil reserves in the region with the ratio of 48.3, 80.1, and 158 billion barrels respectively, and account for more than 15% of the world's total reserves and 17% of OPEC reserves. Due to huge energy resource availability and production, Caspian Sea countries have experienced economic growth at 7-10% of GDP between 2000 and 2010 (during a period of high oil prices) and between 1-1.5% from 2012 and 2015 (period of low oil prices). Although petroleum resources sustain the economies of Caspian Sea countries, industrial activities in the oil sector are associated with substantial environmental degradation, posing a potential threat to sustainable development in the surrounding Caspian region. This manuscript presents data and research on the environmental impact of oil industry in Caspian Sea countries with a particular focus on the Caspian Lowland and Ustyurt Plateau in Kazakhstan. Remote sensing and GIS modelling tools are used to analyse environmentally harmful effects from oil production and use. Recommendations for future data collection and methodologies for assessment on environmental impacts of oil industry are also provided.