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Abstract - text box
The Arctic drives critical contemporary environmental and geopolitical issues. It is a vast and sparsely populated region, often thought of as uninviting, covering about 6% of the Earth's surface and is thought to contain more than 20% of remaining undiscovered hydrocarbon resources. Ongoing high latitude climate change is bringing multiple environmental consequences and challenges, compounded by human population increase and industrial development. On land, biodiversity fragmentation and loss, land use change, and greenhouse gas (stored carbon) release from permafrost thaw receive much attention. At sea, unprecedented sea ice reduction opens prospects for offshore drilling and its marine transportation, as well as wider establishment of marine trading seaways. Several Arctic states (Russia, U.S.A., Norway, Canada) are producers and global exporters of hydrocarbons, with this being essential for their energy security both in meeting domestic demand, and in providing export revenue. Their Arctic resources are considerable: Russia and Norway hold 72% of Arctic gas resources, with the remaining 28% equally split between U.S.A. and Canada. Oil resources are evenly split among U.S.A, Russia, Canada and Greenland. Thus, the Arctic region can significantly contribute to securing 'Arctic5' (the five Arctic littoral countries: Canada, Denmark (Greenland), Norway, Russia, U.S.A.) energy production. However, despite potentially vast offshore hydrocarbon resources in the Arctic, exploration and production rates remain low, with only two oil (in Norway and Russia) and one natural gas (in Norway) field currently in production. Factors underlying this include technical challenges, low oil prices, and the great environmental risks in offshore drilling there. This project aims to identify the main knowledge gaps restricting offshore developments in the Arctic, and by extension, how accurate prediction and risk forecasting are in Arctic marine drilling and the Arctic marine environment.