

Project 'Ice hazards'

Attacking unknowns in modeling of
icing and ice collision hazards

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Relevance to maritime sector

Global warming and Arctic ice /gletscher reduction

More open water in areas with Arctic conditions

More ice and bergy bits drifting

More polar lows

→ More transits, more cruising, more operations involving crew change/supply/export

Hazards: icing and collisions with relatively small ice features

Safety of maritime operations in Arctic conditions

Icing and collision hazards

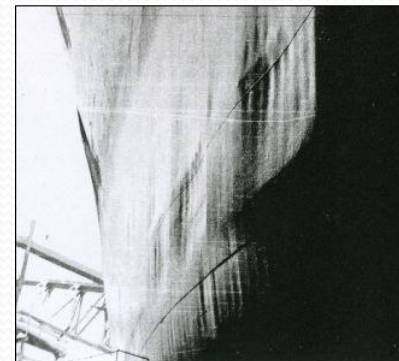


Icing examples

Effect of marine icing



MV Explorer sank after being holed by bergy bit collision



Hull denting after ice impact

Technology gaps

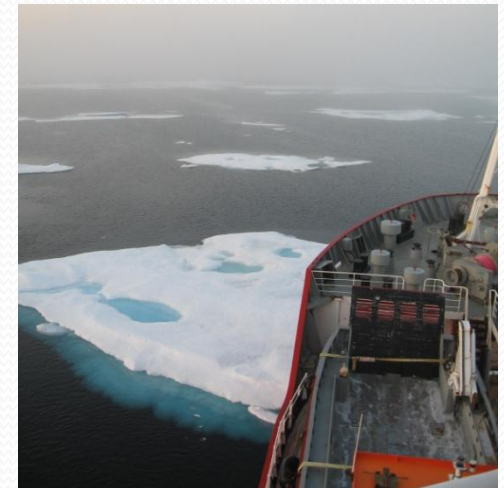
Icing

- Un-validated spray modeling
Lack of validation due to scale effects and full scale cost/difficulty



Collision with single, isolated ice elements (glacial/MY)

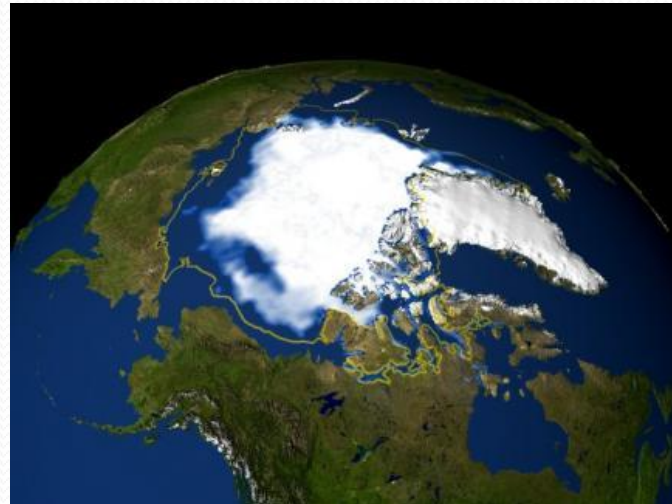
- Computational model for impact process with **deformation/crunching** and **hydrodynamic effects**



Application

- Risk modeling in operations design tools/QRA
- Basis for regulations/guideline development (ISO)
- Design of crew commuting vessels, supply vessels for operation in Arctic conditions

Open sea areas
are not ice free ..



Support

- TU Delft: Prof. Dr A. Metrekine
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- MARIN: Drs A.B. Aalbers
- Others





Thank you