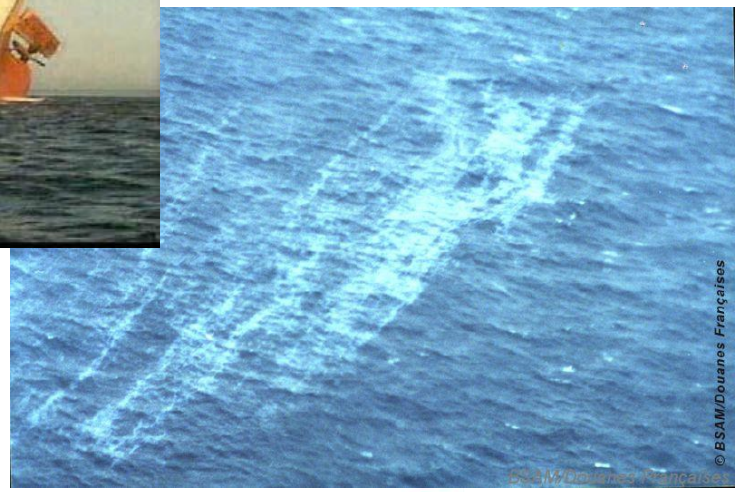
HNS release scenarios, initial conditions for the model



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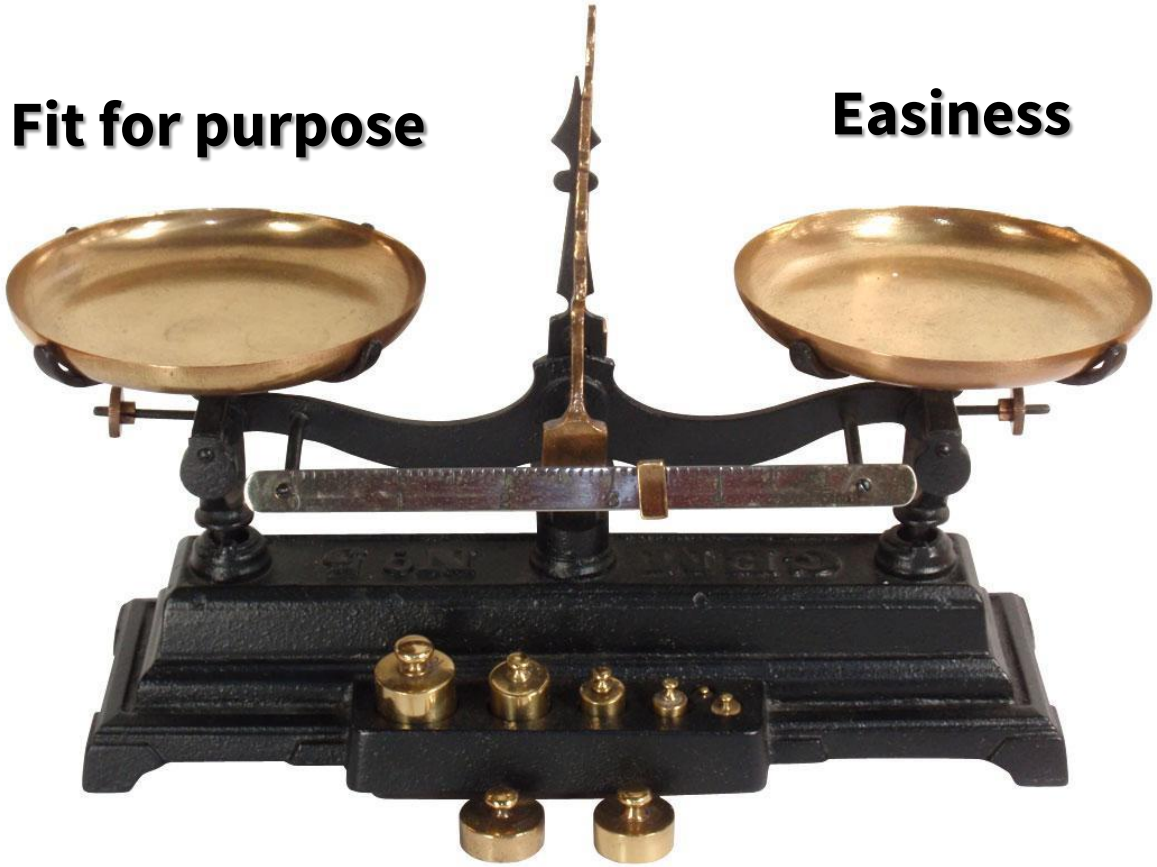
HEALTH, FOOD CHAIN SAFETY AND ENVIRONMENT

Scenario for use in the decision support system



HNS spill scenarios considered in the project "Initial conditions"

Observed pollution

1. At the sea surface
   a. Small to medium spills
   b. Elongated spills
2. Observed in the water column
3. Observed at the sea floor

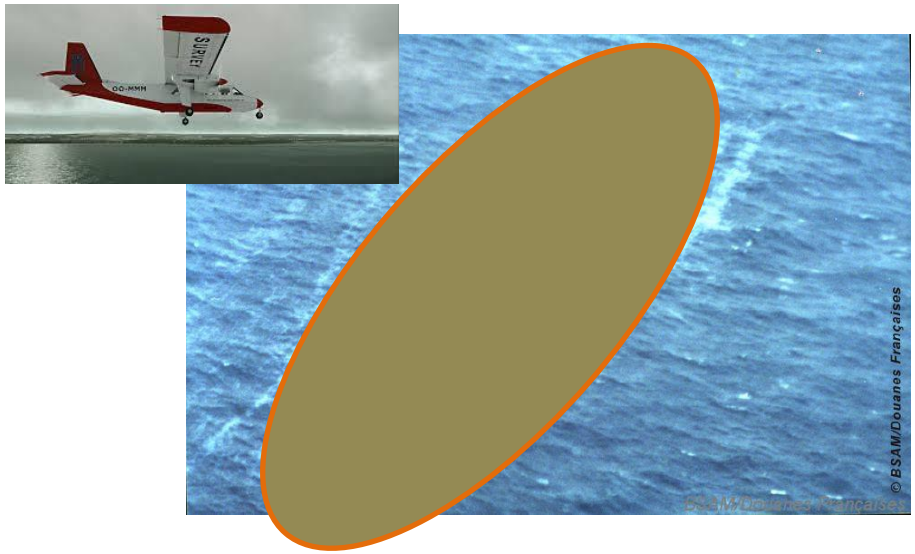
Backward and forward in time

From a known source

4. From a moving vessel
5. From a sunk vessel
   a. Discharge rate prescribed
   b. Discharge rate computed
6. From a broken pipeline
7. From a land source
8. Gas release in the atmosphere
9. From leaking containers adrift

Only forward in time

1. Observed pollution at sea surface
a. Small to medium slick



Surface slick as an ellipsis

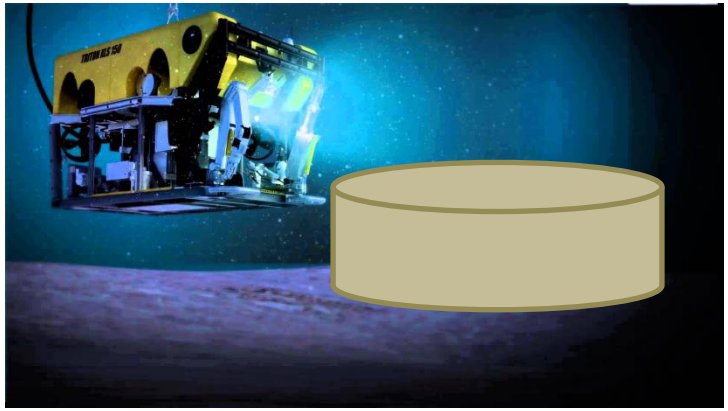
- Lat, lon of the polluted area + observation time
- length, width, orientation of the ellipsis
- Total HNS volume or thickness of the pollution

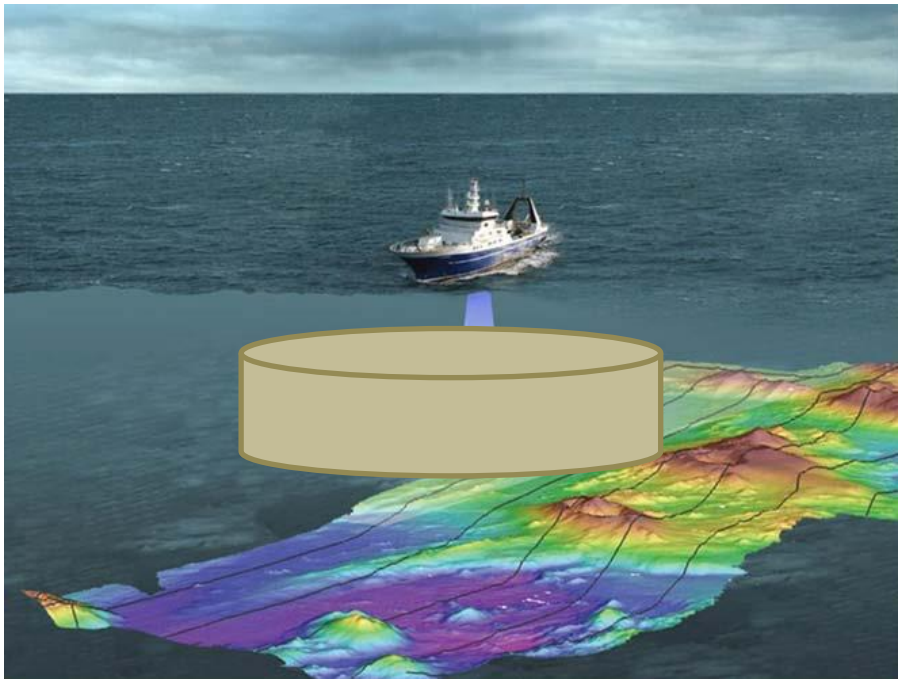
1. Observed pollution at sea surface
b. Elongated slick

Pollution as a straight line

- Lat, lon of both end of the pollution + observation time
- Estimated width of the pollution
- Total volume of the HNS or slick thickness estimation

2. pollution in the water column

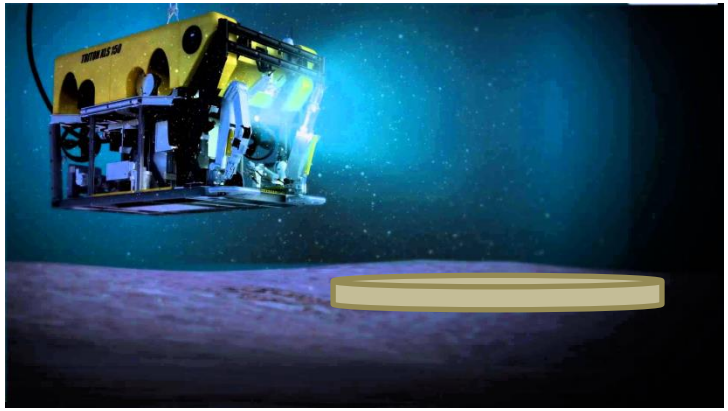


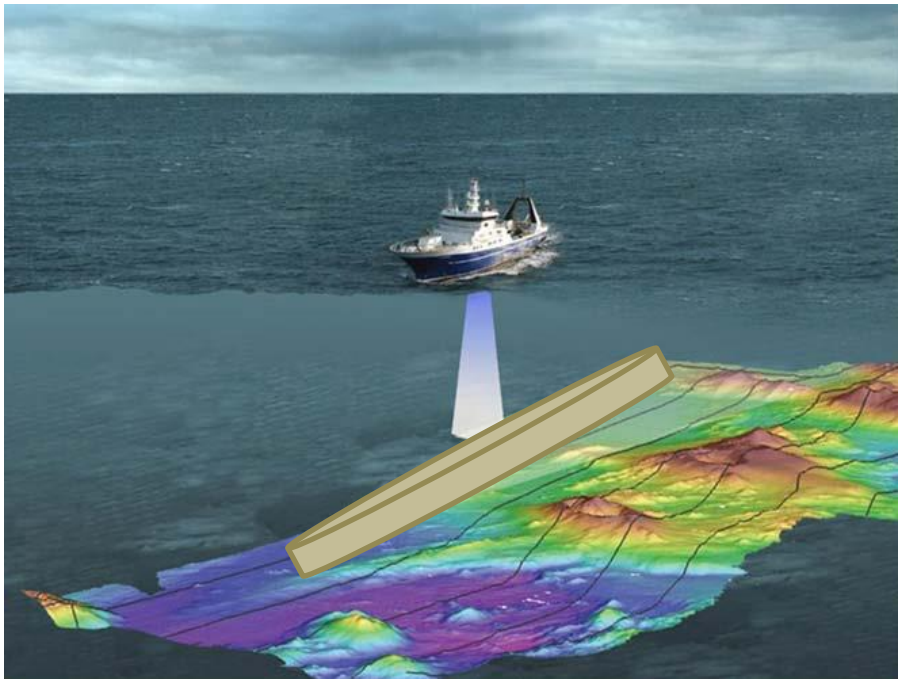


Pollution as an extruded ellipsis

- Lat, lon, depth of the polluted water column + observation time
- Major axis, minor axis, orientation, top and bottom depth
- Total HNS volume or HNS concentration in the water column
- Droplets/bubbles size distribution features

3. pollution of the sea floor

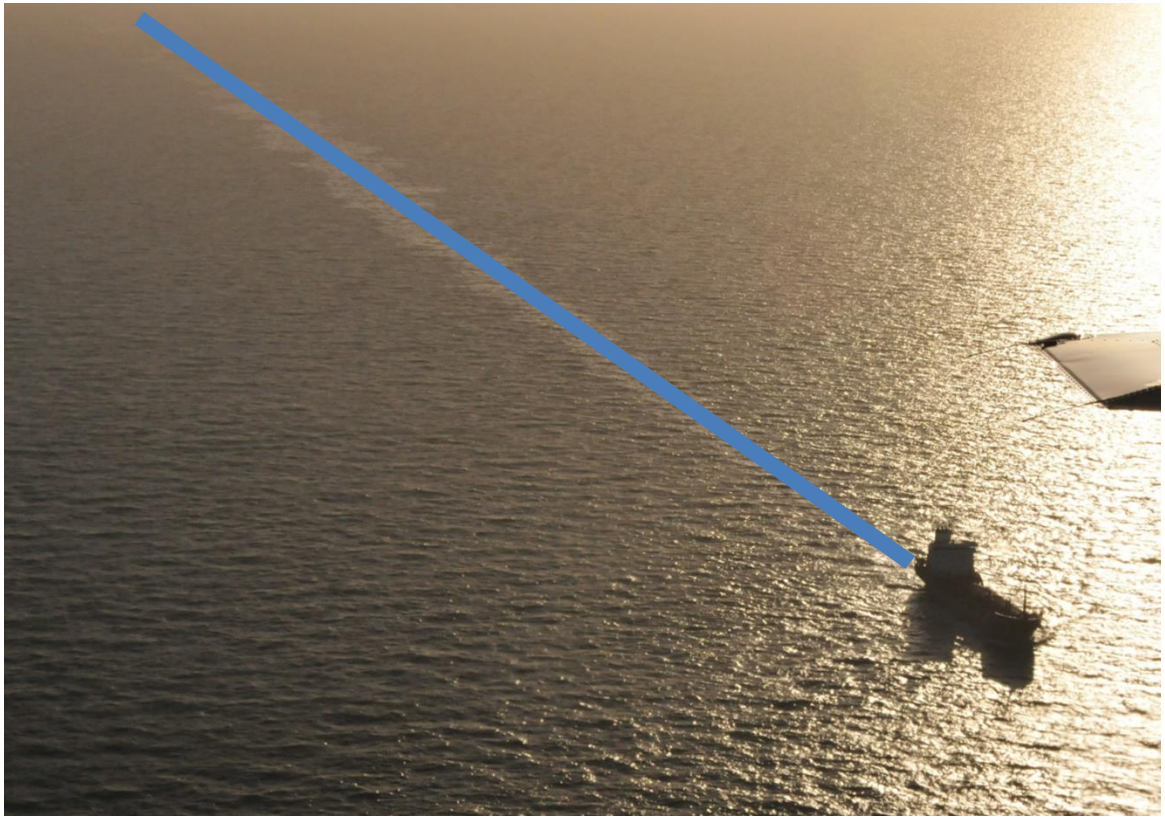




Pollution covers an ellipsis area

- Lat, lon, depth of the polluted area + observation time
- length, width, orientation of the ellipsis
- Total HNS volume or thickness of the pollution

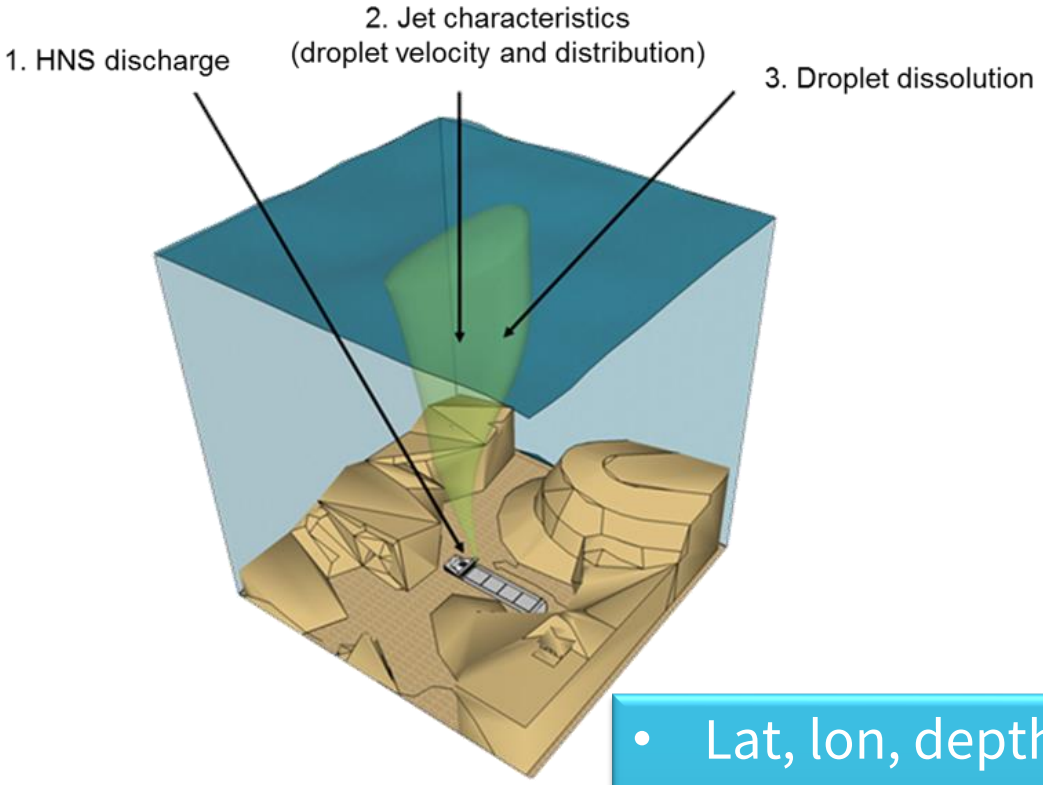
4. Release from a moving vessel



Pollution along a straight line

- Lat, lon at start and end time of the discharge
- Discharge duration
- Total HNS volume or discharge rate

5. Release from a leaking wreck
a. Discharge rate estimated

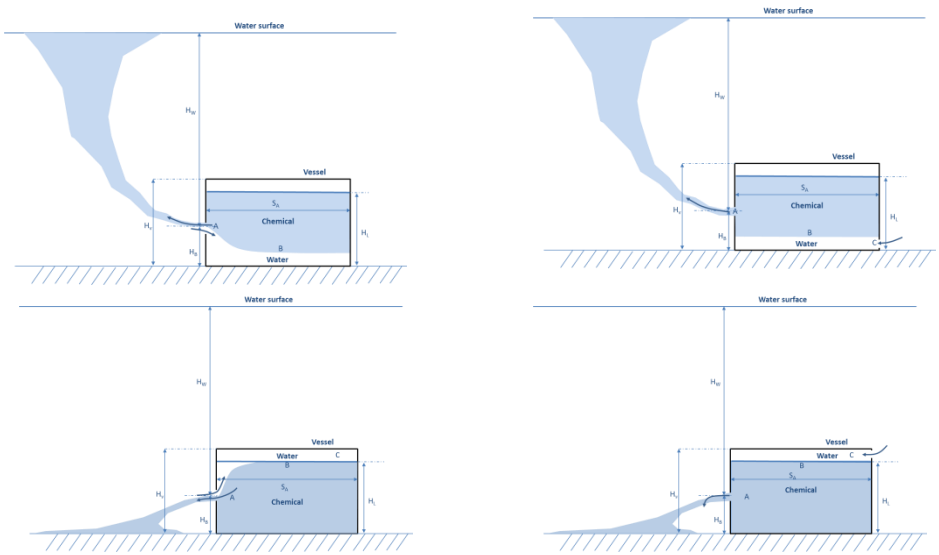


- Lat, lon, depth of the wreck
- Start time of the release
- End time of the release or release duration
- Discharge rate [m3/hr] or total volume released

Co-funded by the European Commission, DG-ECHO

5. Release from wreck
b. Discharge rate computed

- Lat, lon, depth of the wreck
- Start time of the release
- Tank description:
  - total tank volume & height
  - Total HNS volume
- Breach description:
  - #breaches
  - height w.r.t. tank bottom
  - breach diameter



Source : Marine Nationale
Ievoli Sun leak (2000)

6. Spill from a broken pipeline

- Lat, lon, depth, diameter, orientation of the breach
- Start time of the discharge
- End time of the discharge or discharge duration
- Discharge volumic rate or total HNS volume discharged

7. Release from a land source or a river

- Lat, lon, depth of the release source
- Start time of the pollution event
- End time of the pollution event or duration
- Total HNS volume spilt or discharge volumic rate

8. Direct gas release in the atmosphere

- Lat, lon of the source
- Start time of the release
- End time of the release / duration
- Total gas mass (or normalised volume)
- Discharge rate

9. Release from leaking containers adrift

1. Simulation of the container trajectory

- Lat, lon, time of the cargo loss
- # containers/drums adrift
- Crosswind and downwind leeway drift coefficient (function of the object adrift and its immerged volume ratio)

2. Simulation of the HNS drift, fate and behaviour

- HNS volume per container
- Start time of the release
- Volumic discharge rate

11 scenarios that should cover almost all likely cases

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Only forward in time