



# Data Degradation Variations for Maritime Situational Indicator Detection Assessment

Clément Iphar<sup>1</sup>, Anne-Laure Joussemme<sup>1</sup> and  
Cyril Ray<sup>2</sup>

<sup>1</sup>NATO STO CMRE

<sup>2</sup>French Naval Academy Research Centre

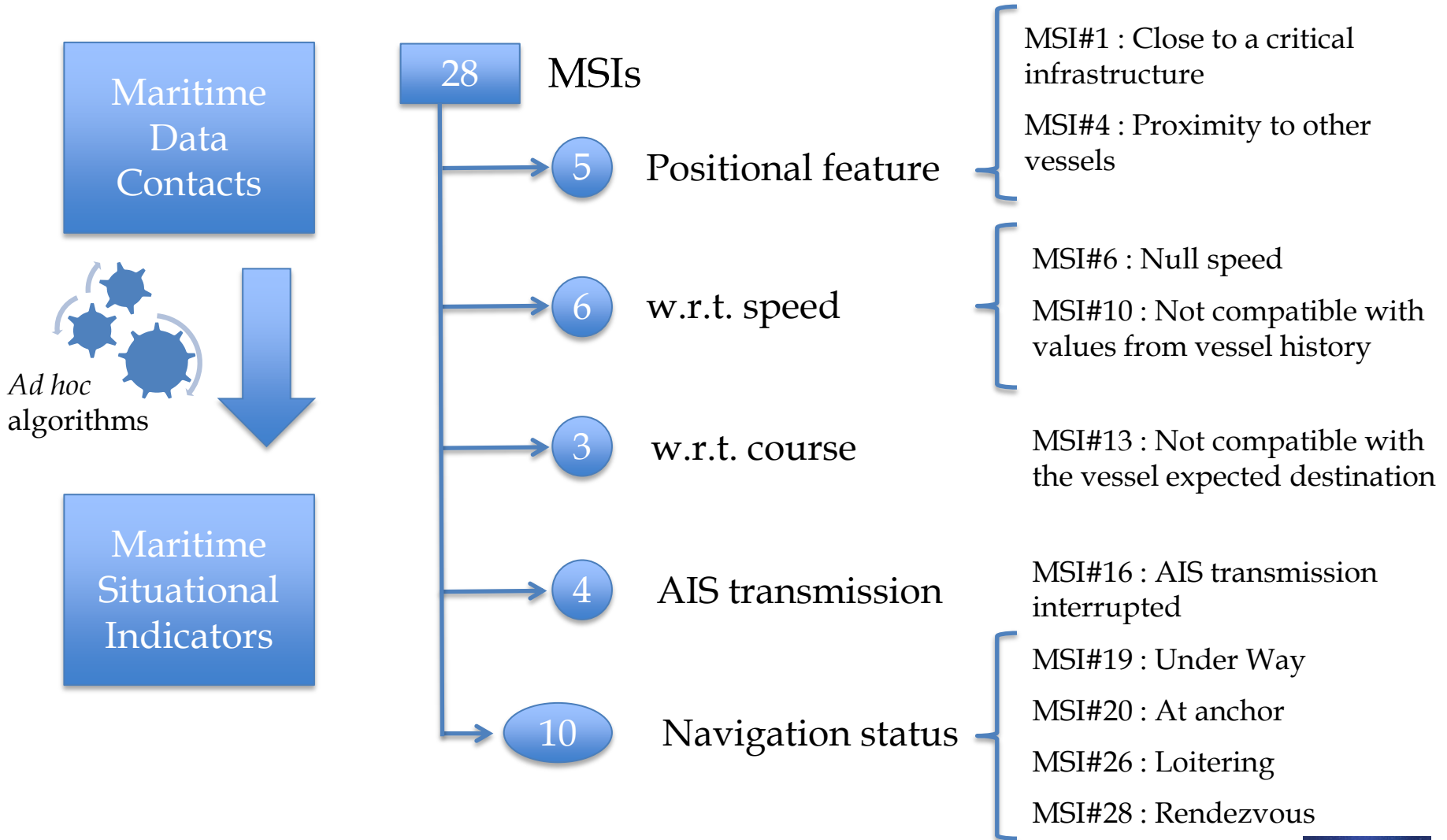


# Monitoring the maritime traffic

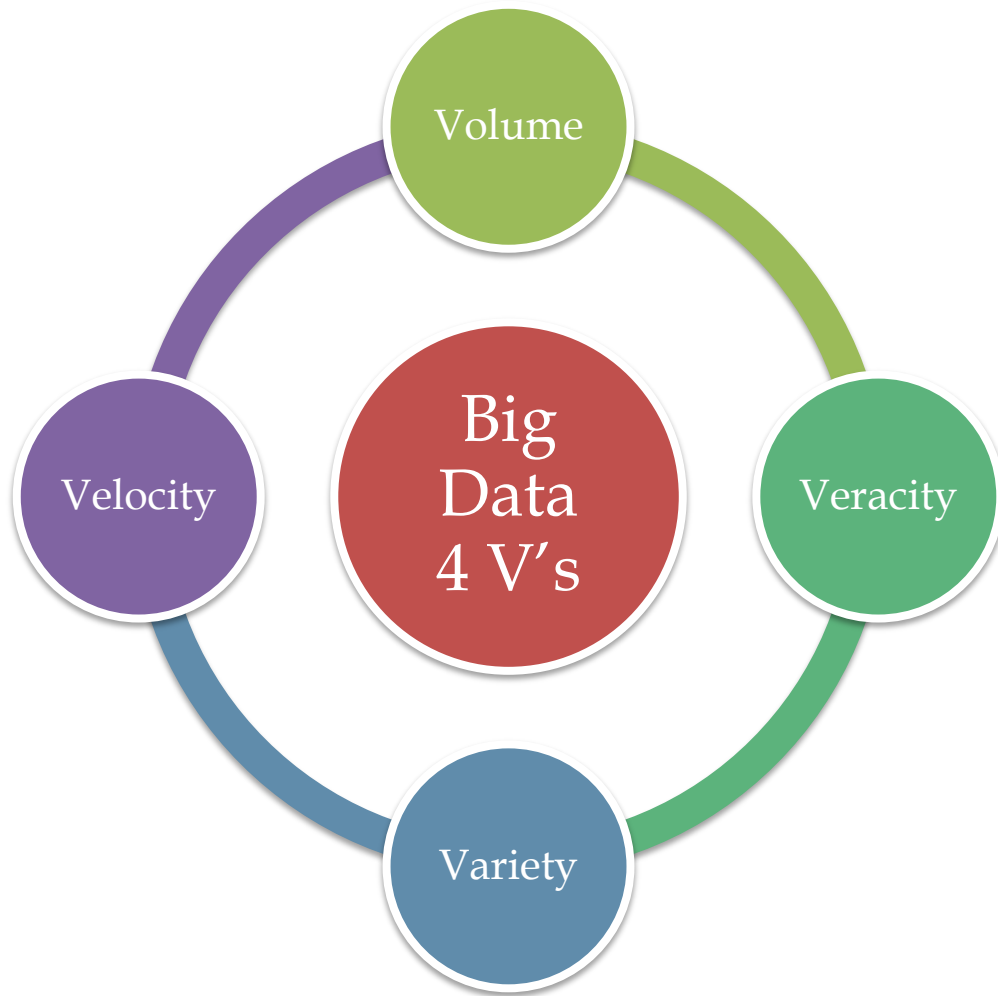


Traffic in Persian and Oman gulfs, from marinetraffic.com

# Maritime Situational Indicators



# The challenges of (spatial) Big Data



Having **spatially and temporally aligned maritime data** relying not only on ships' positions but also on a variety of complementary data sources is required for the understanding of maritime activities and their impact on the environment

Big data challenges should not only rely on fast processing of large volume of positioning data

Evaluate data and data processing under uncertainty, without ground truth

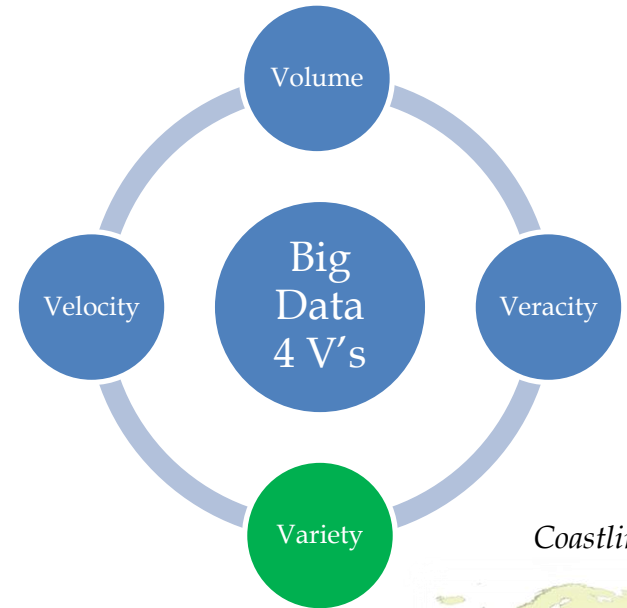
# Variations of Variety

**AIS**

→ IMISG dataset

→ NARI dataset

Datasets in database

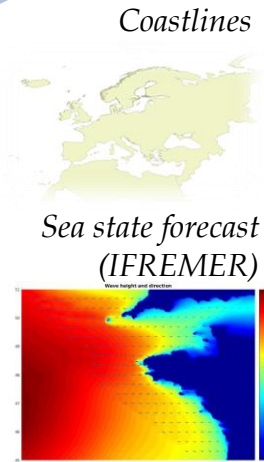


**Various data**

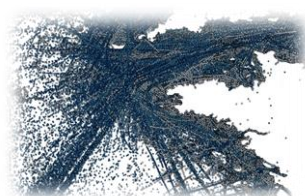
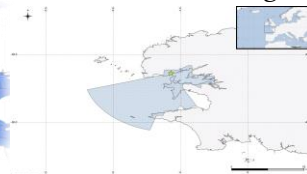
- Areas**
  - Fishing areas
  - Protected areas
  - Coastlines
  - World seas
  - EEZs

- Meteorological**
  - Weather conditions
  - Ocean conditions
- Registers**
  - Vessel registers
  - Port list and locations

- Human**
  - Human Sight
  - Operators



Receptor location & theoretical coverage



Fishing areas map (JRC)

AIS data contacts

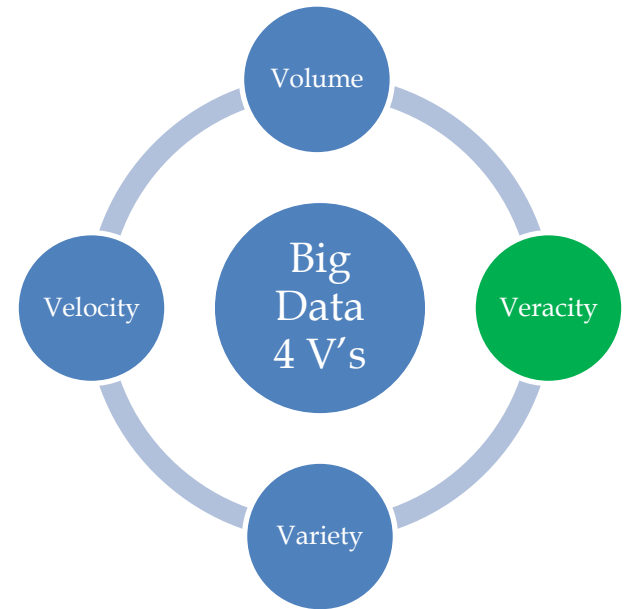
Maritime areas

Ushant TSS

EEZ areas

# Variations on Veracity

Dataset quality characterisation enables veracity variation quantification



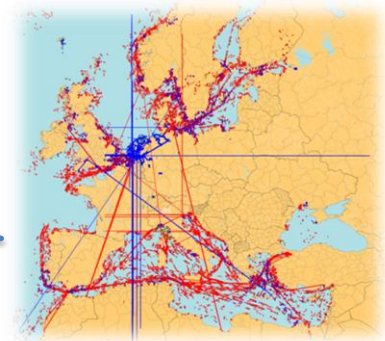
Characterisation of the dataset

Analysis

- General
- En Route / Non en route
- By MMSI
- By vessel type
- By vessel family type

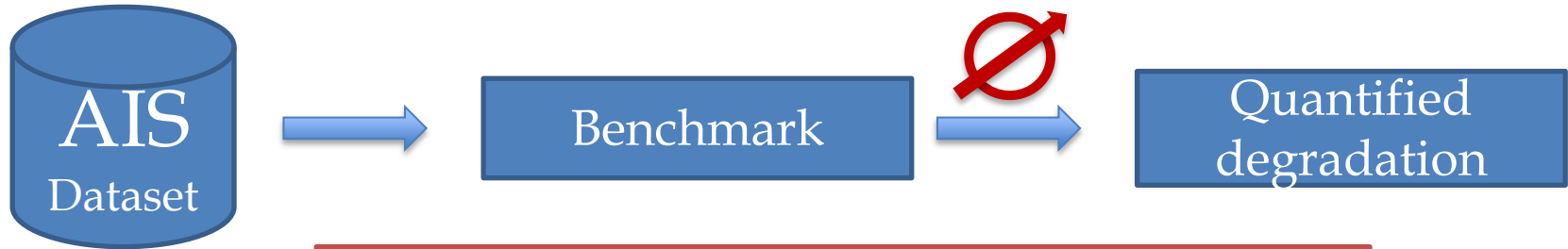
For each field

- N° of null values
- N° of default val.
- N° of zero val.
- N° of non-valid val.
- Mean/median/std mode, skewness kurtosis



*Erroneous trajectories*

# A method for veracity variation



The purpose is to keep control over veracity

## Noise adjunction

→ Using relevant statistical values

## Data modification

→ Of identity of vessels  
→ Of location of vessels

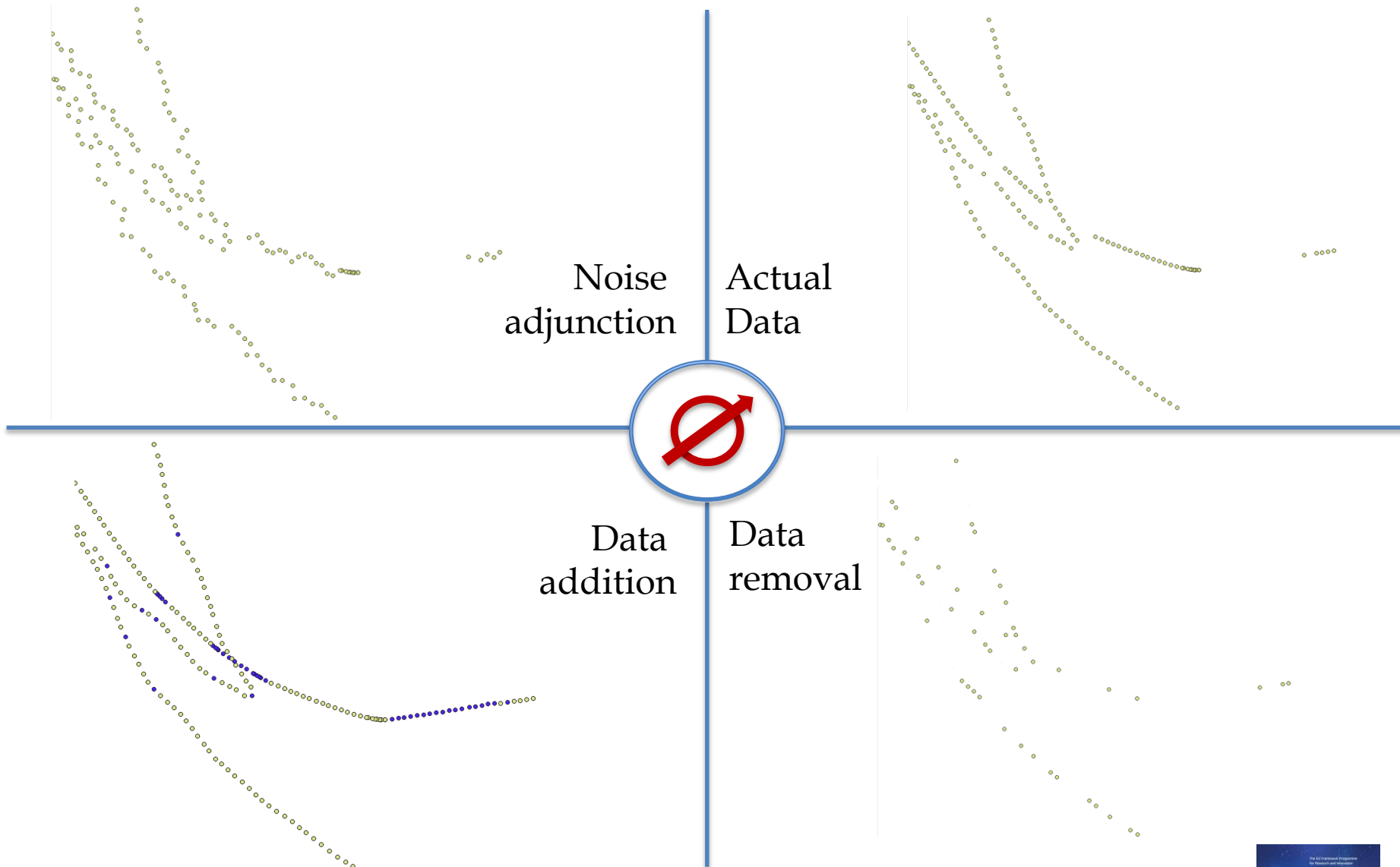
## Data addition

→ Addition of points  
→ Addition of trajectories  
→ Addition of events

## Data removal

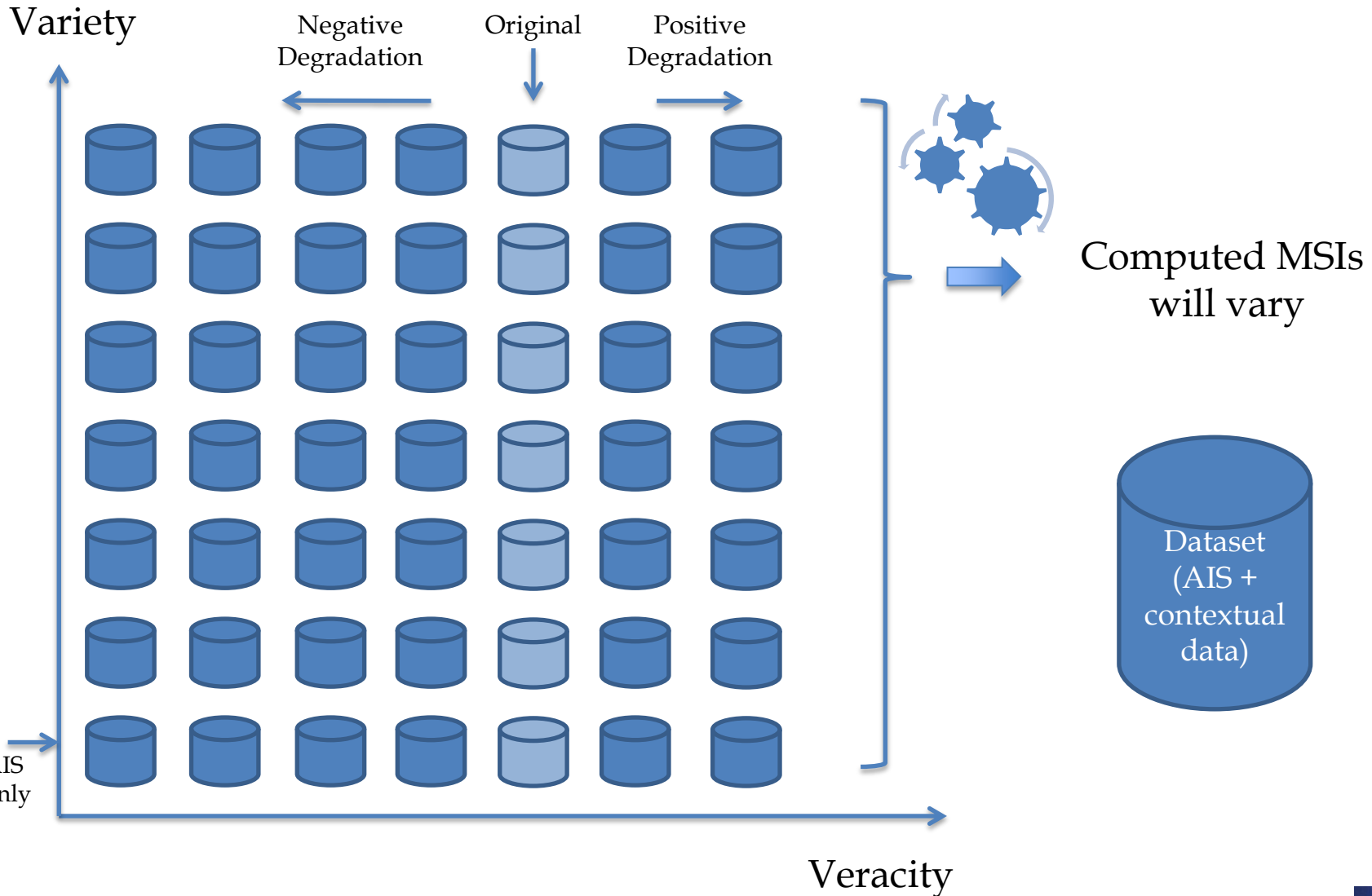
→ Targeted or random  
→ MAR, MCAR, MNAR

# Controlled degradation of data quality





# MSI variations with data quality



# Conclusions and future work

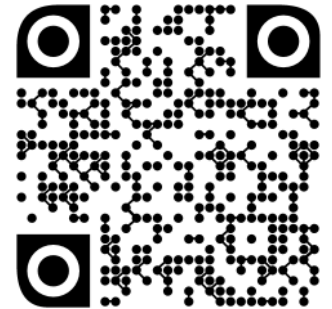
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## Conclusions

- MSIs enable the understanding of the maritime situation, but their assessment is dependant of the quality of data
- The characterisation of the quality of a dataset allows quantified variations of data veracity

## Future work

- Implementation of all degradation methods
- Implementation of the method for MSI prediction assessment
- Formalise links to scenario assessment



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*Thank you for your attention*

*Speaker:*

Clément IPHAR

NATO STO CMRE

Viale San Bartolomeo, 400

19126 La Spezia, Italy

*clement.iphar@cmre.nato.int*

