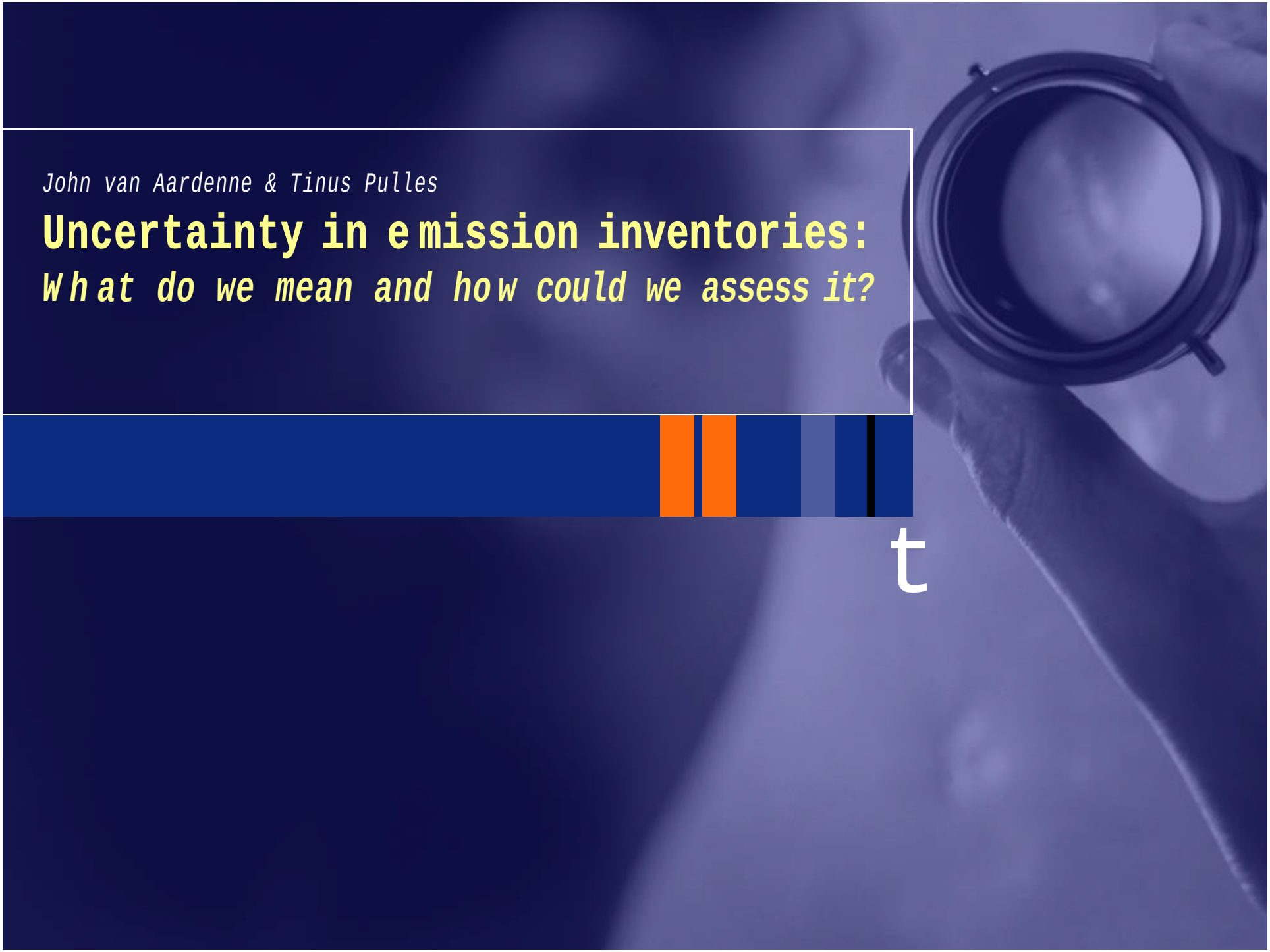
John van Aardenne & Tinus Pulles

Uncertainty in emission inventories:

What do we mean and how could we assess it?



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VERIFICATION

Verification refers to the collection of activities and procedures that can be followed during the planning and development, or after completion of an inventory that can help to establish its reliability for the intended applications of that

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VALIDATION

Validation is the establishment of sound approach and foundation.

In the context of emission inventories, validation involves checking to ensure that the inventory has been compiled correctly in line with reporting instructions and guidelines. It checks the internal consistency of the inventory. The legal use of validation is to give an official confirmation or approval of an act or product.

Perspectives on data quality and intended use of the data

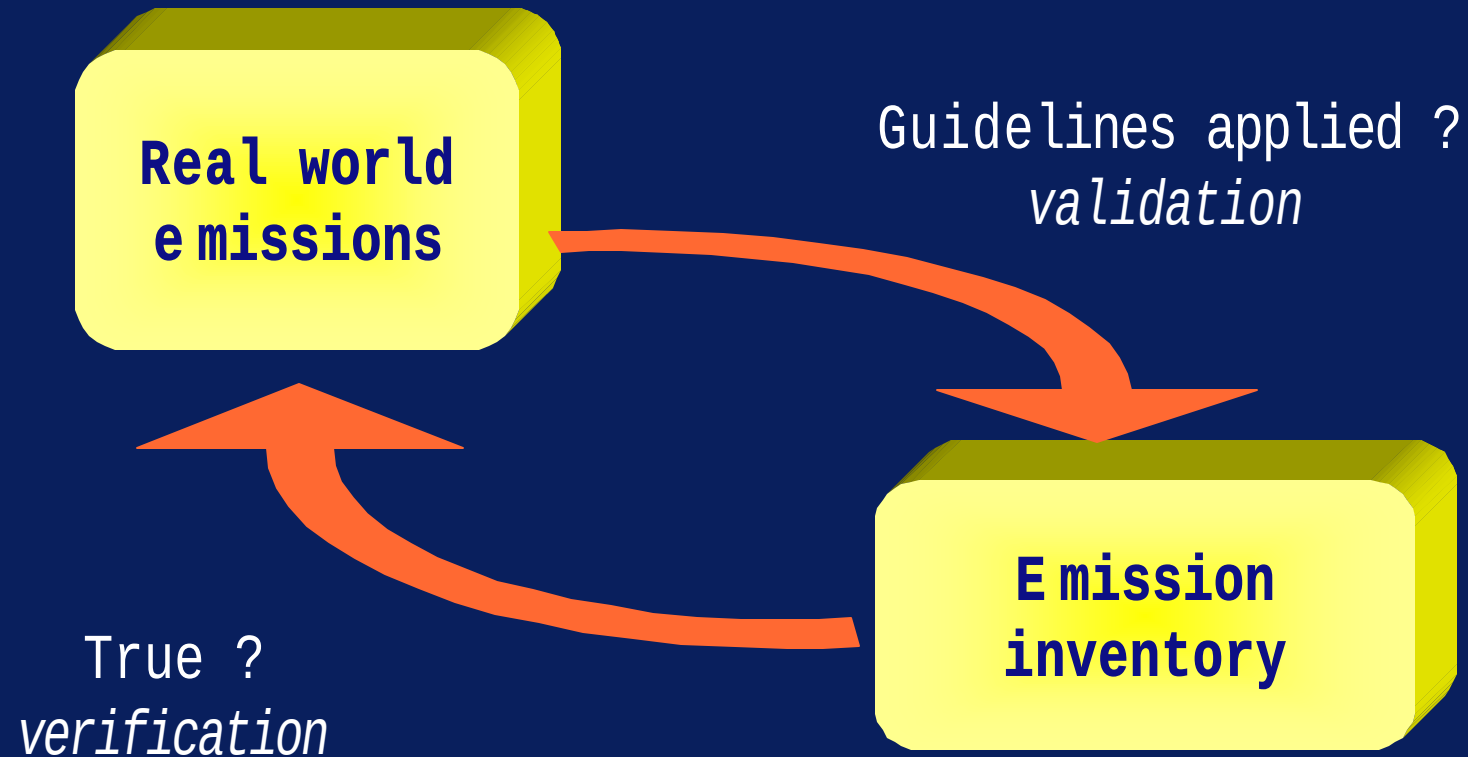
	Perspective	*High*
Scientist	**Scientific debate:** search for weaknesses and errors	… it … that … ed
Policy maker	**Political debate:** search for consensus agreement	… everybody … agrees
Lawyer	**Judicial debate:** search for proof or doubt	… it convinces a judge or jury

True

Agreed

Convincing

Verification & Validation



Verification

- indicates truth, reliability and credibility of the data reported.
- external checking

Validation

- the establishment of sound approach and foundation
- internal checking

Verification

methods:

- Error propagation
- Independent checks
- Measurements and models

objectives:

- ✓ Accuracy
  (no systematic error)
- ✓ Precision
  (no random error)

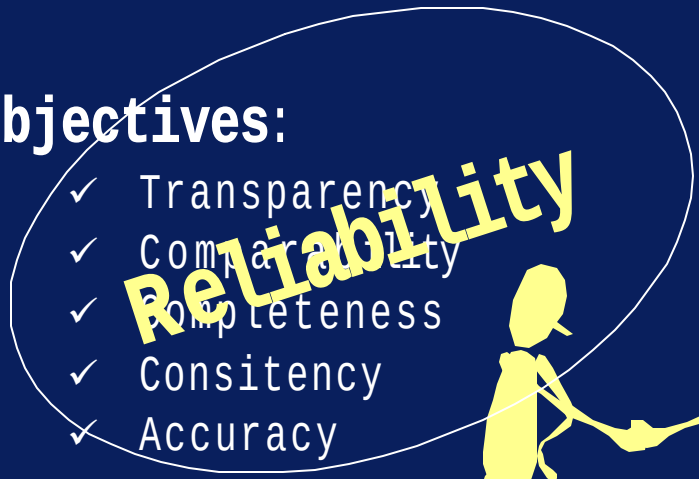
Validation

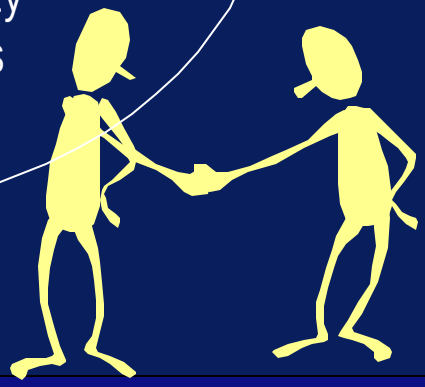
methods:

- country comparisons
- quality control
- auditing
- feed back

objectives:

- ✓ Transparency
- ✓ Comparability
- ✓ Completeness
- ✓ Consitency
- ✓ Accuracy





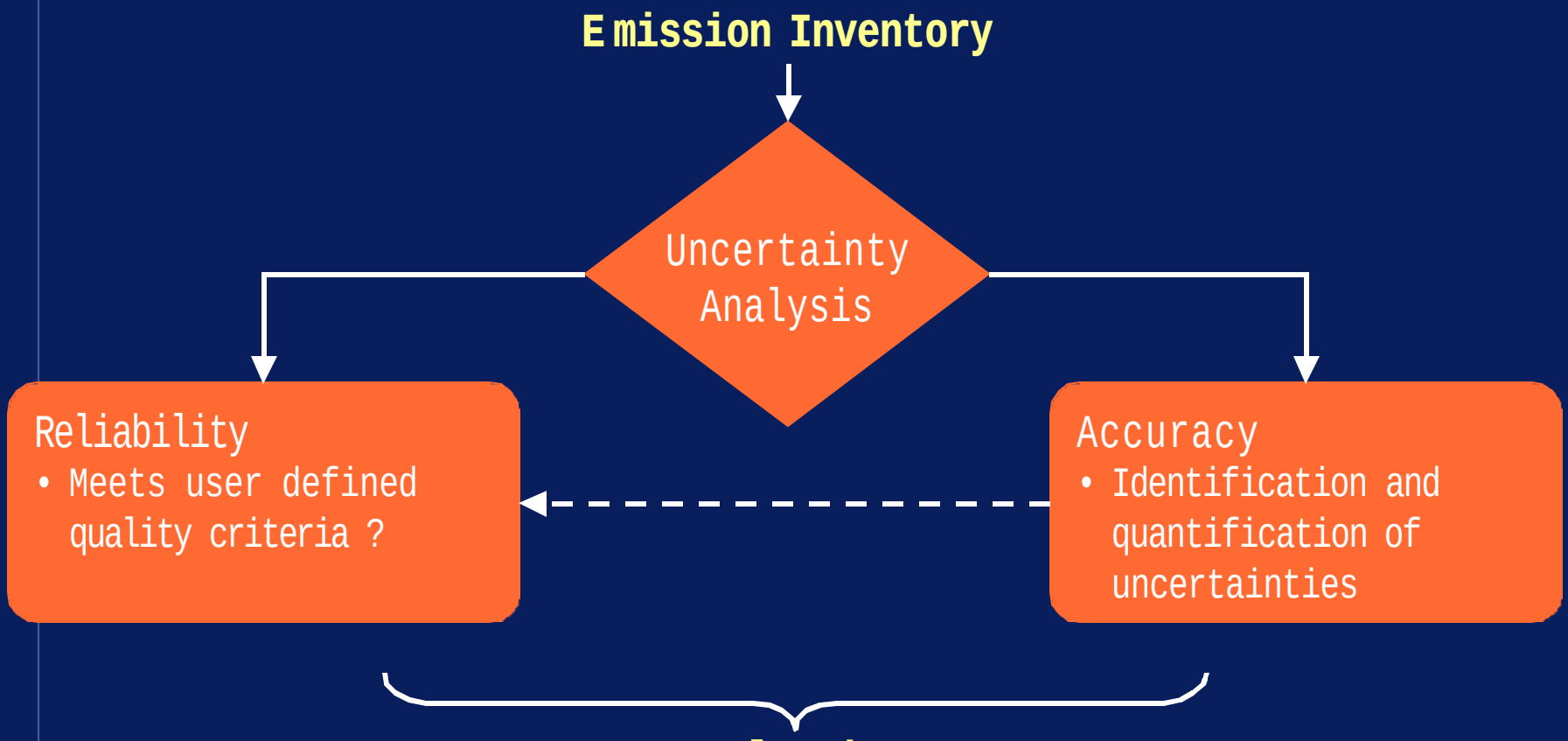
Sources of unreliability

Unreliability		
T	Transparency	✓Insufficient documentation
C	Consistency	✓Different methods for different years ✓Inconsistent activity data
C	Comparability	✓Deviations of sectro split and fuel defs ✓Deviations in sector grouping ✓Incomplete reporting
C	Completeness	✓Omissions of sources and/or pollutants
A	Accuracy	✓See below

Sources of inaccuracy

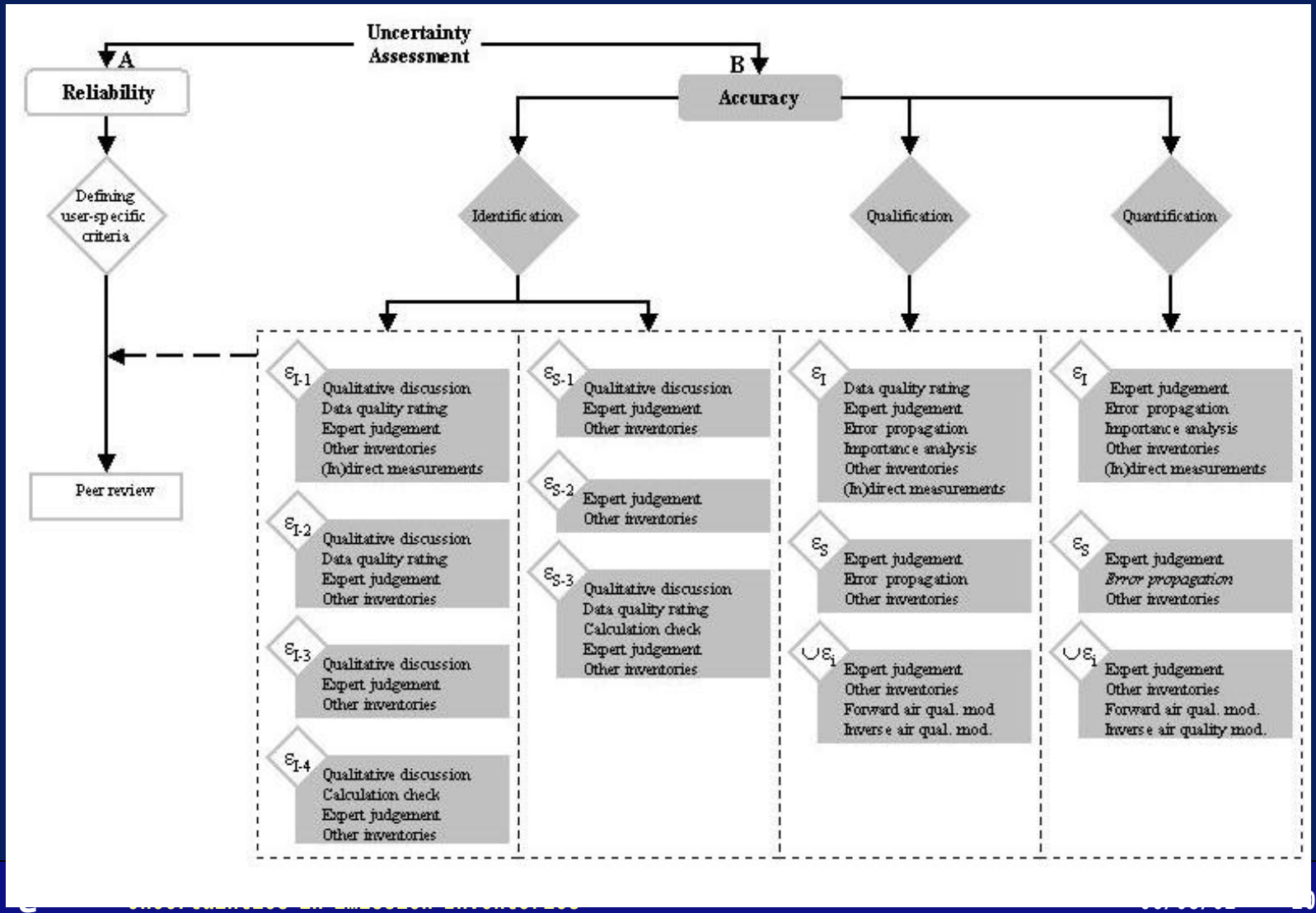
Inaccuracy	
Structural	✓Aggregation error ✓Incompleteness ✓Mathematical formulation error
Input value	✓Extrapolation error ✓Measurement error ✓Unknown developments ✓Reporting error

Assessing uncertainty



FRAULEIN

FRamework for the **A**ssessment of **U**ncertainty in **L**arge scale **E**mission **In**ventories



Discussion and conclusions

- **Uncertainty can be discussed from different perspetives:**
  - Scientific — *Accuracy* and *precision*
  - Policy oriented — *Reliability* *TCCCA*
- **Depending on the perspective different tools should be used:**
  - Scientific — *Identification, quantification of uncertainties*
  - Policy oriented — *Auditing*
- **In the end inventories in policy applications do not need to be “the best”.They need to be “good enough”.**