



## Data transformation in DIVA

*J.-M. Beckers, A. Barth, M. Belounis, M. Ouberdous, C. Troupin,  
with the help of M.-E. Toussaint, A. Alvera-Azcárate,  
A. Capet, L. Geron, F. Lenartz*

MARE, AGO Department  
University of Liège

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# Why transform the data?

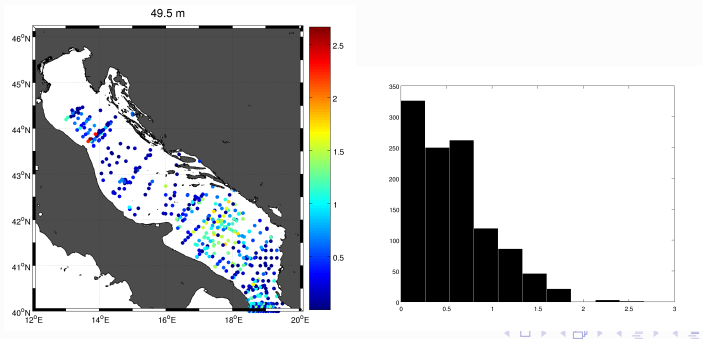
## Problem:

- Non-Gaussian variable → unrealistic values in analysis
- Example: negative concentration, negative salinity, . . .

## Solution:

- 1 Apply a transformation on the data, prior to analysis
- 2 Perform the analysis
- 3 Apply inverse transformation on analyzed field

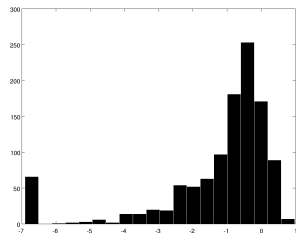
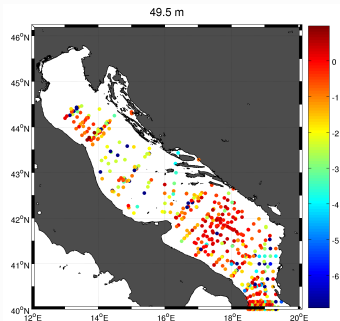
Example: nitrate concentration in the Adriatic



# Transformation 1

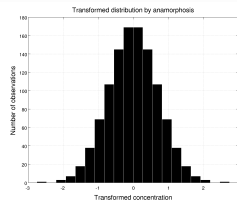
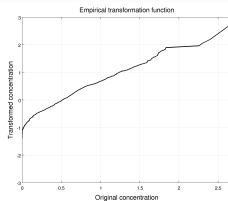
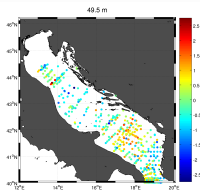
## Logarithm:

- + transformation not dependent on the data
- + inverse transformation is known
- needs strictly positive values
  - problem with null concentrations
- inverse transformation can create extrema

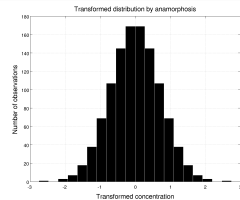
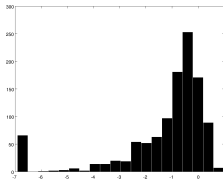
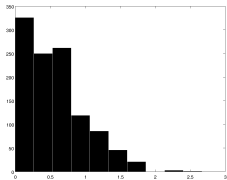


## Anamorphosis:

- + transformation computed from the data themselves
- + final distribution is close to Gaussian
- transformation function may require extrapolation



# Comparison: histograms



## **Analysis** option in the `driver`

10 : exponential applied on data

11 : logarithm of data (small value added to avoid  $\log(0)$ )

12 :  $\text{data}^2$

13 : anamorphosis (optimization phase)

14 : user-chosen transformation (Fortran file to edit)

## **Remark:** during extraction

use file `var.bounds` to specify min and max