**RESULTS: solutes**

- Chloride concentration and travel time modeling
  - Mean = 320 d
  - Standard deviation = 250 d
  - Median = 120 d
  - Min = 10 d
  - Max = 5000 d

- Chloride concentration distribution
  - Normal distribution
  - Mean = 320 d
  - Standard deviation = 250 d
  - Median = 120 d

**RESULTS: travel time distributions**

- Upper Hafren: travel time distribution
  - Mean = 320 d
  - Standard deviation = 250 d
  - Median = 120 d

- Lower Hafren: travel time distribution
  - Mean = 320 d
  - Standard deviation = 250 d
  - Median = 120 d

**MODELING TO EXPLORE RESEARCH QUESTIONS:**

- What are the relevant streamflow generation processes?
- What causes positive/negative peaks in solute concentration?
- What are ages/solutes mixing processes at the catchment scale?
- What is the age of discharge?

**THE MODEL**

- Hydrochemical model
  - Streamflow is a combination of rz and gw components.
  - Consideration of storage-discharge relationships.
  - Introduction of mixing hypothesis.
  - Role of residual storages.

- Travel time distributions model
  - Travel time distribution (TTD) is the age distribution of the water exiting the catchment.
  - Mixing scheme: Residual storage and gw storage.

**SOLUTES MIXING**

- Global solute correlation
  - Interplay between rz and gw storages.

**CONCLUSIONS**

- The interplay between rz and gw storages results in a broad range of values.
- Travel time distribution model is calibrated based on observations.

References:

- Plynlimon data set (free to download): *http://www.nerc-bbrc.ac.uk/research/data/ishp*.
- SOIL MIXING
  - Mixing scheme: Residual storage and gw storage.
  - Global solute correlation
    - Interplay between rz and gw storages.

**only one mean value!**

**NOT JUST ONE MEAN VALUE!**

Every simulated day samples a different discharge generation and hence a different streamflow. The same mean/median values over a large number of repetitions will give different results due to the stochastic nature of the process.

The high variability of solute concentrations to discharge under natural streamflows is in many cases not visible due to the random nature of the concentration generation process.

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