



How the demonstration of the terrestrial water cycle on the Seine River by Perrault?

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Since the antiquity, three main hypotheses have been proposed in Greek and Roman literature to explain the now well-known terrestrial part of the water cycle. Such hypotheses have been formulated by Anaxagore (500-428 BC), as reported by Aristote, then Lucrèce (98-55 BC): the water cycle is due to the combination of precipitation and evapotranspiration. Despite some measurements have been conducted during the medieval period, the water cycle has been fully demonstrated only at the Renaissance. Perrault (1664) has proposed an estimation of the annual budget of the Seine River in Paris, showing that the annual flow can be estimated using the precipitation on the corresponding catchment. This history has been largely reported by different authors (Dooge, 1959; L'Hôte, 1990; Chow, 1964, 1988). What is not so well-know is that this demonstration has been done despite huge errors on precipitation and annual discharge which have compensated one another so that the calculated ratios of the output/input are very similar now than those calculated by that time. All the details on these estimations will be provided. This story illustrates that: 1) budget are powerful tools and could always be useful to identify sources and compartments for multiple elements, at various temporal and spatial scales, in relation with global changes; 2) the formulation of clear hypotheses have to come before measurements and could take time to be fully demonstrated.