Megadroughts – How frequent they are and what Causes Them

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Toby Ault and Scott St. George published recently the article: “Unraveling the Mysteries of Megadroughts” in the journal Physics Today of August 2018 [1]. They claim US and Mexico experienced their worst droughts (in the last 150 years) between the years 2000 and 2014. They did a lot of measurements of tree rings in the American West, which provide the most complete record of droughts. The results of their measurements are interesting, but they don’t deliver the promise in their title - they don’t unravel the mysteries of megadroughts. We do unravel the mysteries of megadroughts based on study of the glaciers.

According to their measurements, the most severe droughts were between 11 and 15 centuries with the most pronounced megadrought in the mid 1100s. They assume that increased solar activity caused the megadrought, but do not provide any additional evidence. Study of the glaciers shows (Figure 2) that this was the time of the third and most substantial maximum of temperatures before the temperatures starting falling down after the year 1350 AD, which marks the beginning of the last Ice Age (Figure 2). The authors even admit that droughts might be a mere coincidence. They are not a mere coincidence [2].

According to studies of local cypress trees, Southwest Asia was wracked by two prolonged megadroughts - one in the late 14th century and a second in the early 15th century. This explains why the prosperous Angkor in Cambodia, which was on a territory larger than contemporary Paris, was abandoned in the early 15th century. According to Figure 2 from study of the glaciers [2], this is the time of sudden increase of temperature right in the middle of the Ice Age.

Obviously, the megadroughts took place when the temperature was rising up fast in the 11th century and during the period of sudden warming in the middle of the Ice Age at the beginning of the 15th century (which brought the Renaissance). The gradient of temperature increase, obviously, creates gigantic fluctuations in the air flux El-Nino over the tropical Pacific Ocean, which is the basis of the observed megadroughts in the American West and South East Asia.

References
2. John Imbri, Katherine Imbri (1979) Ice Ages - Solving the Mystery.

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