

Interactive comment on “Climatic variability and human impact during the last 2000 years in western Mesoamerica: evidences of late Classic and Little Ice Age drought events” by A. Rodríguez-Ramírez et al.

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Reviewer comments:

-Although there is no rise in *A. minutissimum* during the Colonial period, there is an increase in magnetic susceptibility. Could you comment on whether this is likely to be entirely climatically driven? Do historical records indicate whether there was any occupation in the basin over that time?

-It is stated that the lake is currently oligotrophic, with the diatom record indicating

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earlier phases of eutrophication (based on *A. minutissima*) linked to human activity. Could you comment on whether the intensity of current activity within the basin is less than would have occurred in those earlier phases?

-It would be useful to comment on whether there is evidence for post-Conquest catchment disturbance? Although no increase in *A. minutissimum* there is a rise in MS during the 18th C – is this considered to be climatically driven?

Our reply:

We do not think that the increase in magnetic susceptibility during the Colonial period is only climatic, we think it is most be related with human presence, the reason why there is no *A. minutissima* most likely has to do with the different cultural practices during prehispanic times and Colonial times, however we have found very little historical/archaeological information from the basin itself to support this argument. In any case we believe that human impact during colonial times is slightly out of the focus of the paper, as the reason for including it is to sustain that during the Classic there is no significant anthropogenic impact in this lake that could be masking the climatic signal. Besides, it is difficult to have a deeper discussion about human impact in this lake without the pollen data, which are now been integrated by Susana Sosa and Socorro Lozano in new manuscript which will focus mostly on vegetation.

Reviewer comments:

-Can you explain a little more about the Toba Jala identification? Is this based on geochemistry or stratigraphy? Has this been dated elsewhere and how does that age correspond to the age-depth profile here? -Was this identified geochemically, or based on position and physical characteristics? Are there independent ages on it which help strengthen the chronology? Would be helpful to clarify. How thick is the tephra layer? -Is there any response to the Toba Jala eruption in the diatom record? There is a peak in *E. minima* and increase in diatom concentration above – but looks as though sample may not be directly above the layer. Would be good to comment on this.

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Our reply:

We cannot identify a clear response of the diatoms to the tephra layer (except for low diatom abundance at the tephra sample itself), the *E. minima* and total abundance peaks are not directly above the tephra layer.

The details of the identification of this pumice layer were presented in the paper by Vazquez et al. 2008. The correlation is mostly based on physical characteristics (colour) and age. According to our chronology this tephra dates to ca. AD 860 which falls within the range of the 6 calibrated dates that are available and considered reliable for this tephra (ca. AD 800 to ca. 1200, Sieron and Siebe 2008, see new figure 2).

Thickness of the tephra was 13 mm, this information as well as the reference to Sieron and Siebe 2008 have been added to the manuscript. Figure 2 has now the location of the toba Jala in our sequence and the reported ages for this toba to show good correlation.

Sieron K and Siebe C., 2008 Revised stratigraphy and eruption orates of Ceboruco stratovolcano and surrounding monogenic vents (Nayarit, Mexico) from historical documents and new radiocarbon dates. *Journal of volcanology and geothermal research* 176: 241-264.

Reviewer comments:

-It would be good to indicate on the diagram which levels the low counts are from (e.g. dost/crosses down the R side next to the concentration profile) as the assemblage data from these levels may be less reliable.

Our response:

We included a + mark at all levels where counts were low (100 diatoms), even though we consider that this is unnecessary, as these samples have low abundance, and this can be seen in the figure in the total abundance graph.

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Reviewer comments:

-I think it would be useful to include discussion (and add to the map in Fig 1) of the recent paper by Bhattacharya et al (2014, PNAS vol 112: 1693-1698) from Aljojuca in the eastern highlands of Central Mexico. As that sequence covers the same time period (with focus on human-climate interactions) it would be a valuable point of comparison.

Our response:

We are familiar with this paper, we have added it as suggested.

Additional comment from editor:

I propose to include a new Synthesis Figure (new Fig. 4) with the proxy time series of the archives discussed in the text (mainly Section 7; Time series of proxies Nr 1-7 in Fig. 1 plus SMO). The ms would substantially benefit from a Synthesis Figure.

Our response:

We agree, and have prepared the figure.

Interactive comment on *Clim. Past Discuss.*, 11, 1887, 2015.

C1400

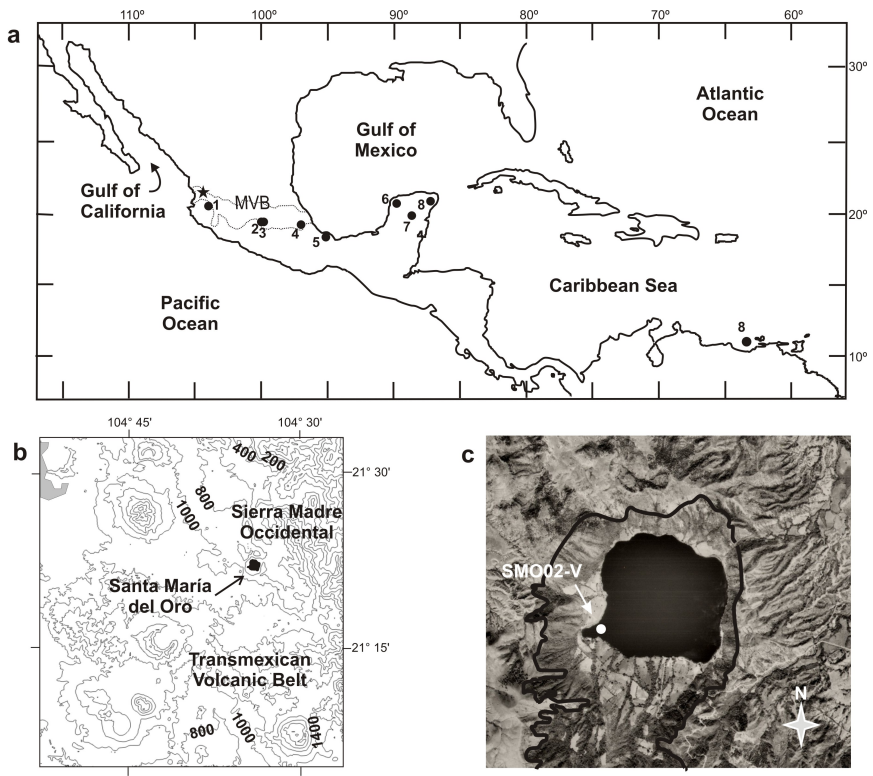


Fig. 1.

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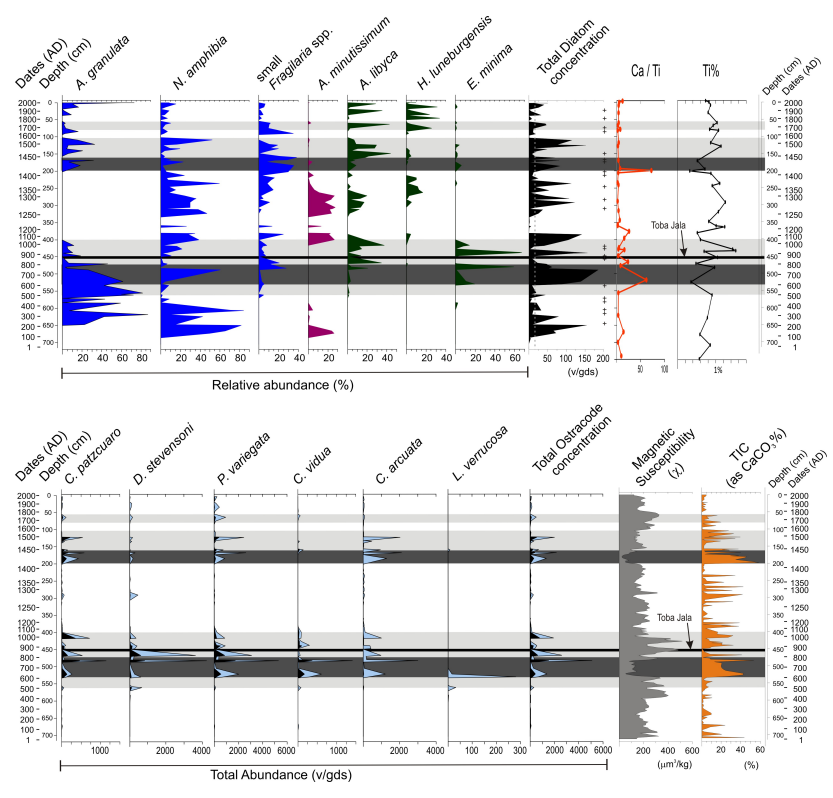


Fig. 2.

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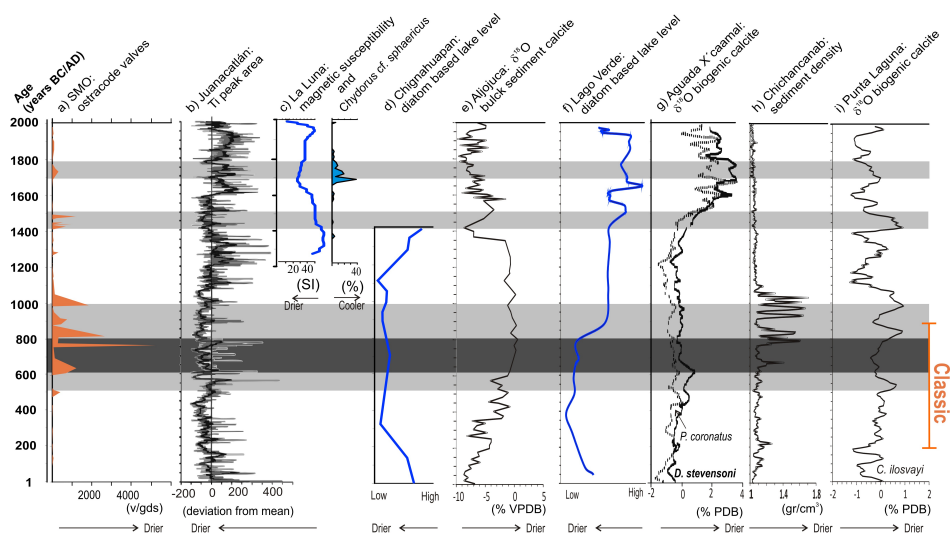


Fig. 3.

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