

Interactive comment on “7300 years of vegetation history and climate for NW Malta: a Holocene perspective” by B. Gambin et al.

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The new paper by Gambin and her co-workers is to be welcomed on a number of counts

- this is the first quantitative palaeoclimate reconstruction for the Maltese Holocene, and is based on a widely-accepted methodology
- this provides welcome new evidence for the complexity of Holocene vegetation in the Maltese Islands
- this provides important palaeogeographic and cultural information for this part of the Maltese Islands

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In general the science here is excellent, and interpretations of data are well-founded and parsimonious.

Some minor issues for the authors to consider:

- It is highly unlikely that sedimentation in these marginal marine situations was truly continuous or steady. Use of a smoothed sedimentation curve is necessitated by the rather few dates (this is a recurrent problem in the Maltese Islands where Frank Carroll and the FRAGSUS project have also struggled to find dateable material), but interpolated ages must therefore be treated with some caution.
- I feel that the discussion generally and in particular the statement on p. 4522, 20 that there was little deciduous woodland on Malta in the Early Neolithic, neglects the emerging evidence for regional patterning of vegetation during much of the Holocene in the Maltese Islands. The evidence from the Marsa pollen diagram of Carroll et al. (2012, 31) suggests not deciduous but coniferous woodland before ~6500 cal. BP (very high Pinus and fairly high Juniperus). The Salina Bay pollen diagram of Carroll et al. (2012), a few km seaward of the Burmarrad core, did not show evidence for extensive woodland or scrub in any part of the Neolithic. Overall, given the evidence from Burmarrad, this is perhaps consistent with very localised patches of scrub and woodland at this time. This patterning of vegetation across Malta through the Holocene is all the more evident with the publication of a further pollen diagram, from Tas-Silg in southern Malta (Hunt, C.O. 2015. Palynology of some archaeological deposits from Tas-Silg. in Bonanno A. & Vella, N. C. (eds). *Tas-Silġ, Marsaxlokk (Malta) I: Archaeological Excavations conducted by the University of Malta, 1996–2005*. Leuven, Peeters, 437-449). Burmarrad emerges as a very particular place, although some trends, such as the relatively high Olea in Punic to Late Roman times are visible in the core at Marsa. It is perhaps necessary, therefore, for the authors to consider whether this evidence for patterning, most likely as the result of anthropogenic management of vegetation, might impact on the climate reconstructions.

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- The characterisation of the Eastern Mediterranean as seeing an increase in precipitation before ~6500 cal. BP (page 4537, 27) is correct only for the Northeast Mediterranean. South of the Dead Sea, a different pattern obtains, with generally decreasing precipitation through the Early-Mid Holocene (Hunt, C. O., Gilbertson, D. D. & El-Rishi, H. A. 2007 An 8000-year history of landscape, climate and copper exploitation in the Middle East: the Wadi Faynan and the Wadi Dana National Reserve in southern Jordan. *Journal of Archaeological Science* 34, 1306-1338.)

- The evidence for a real rise in olive cultivation in the Roman period parallels that from Tripolitania, Libya (e.g. Barker, G. W. W., Gilbertson, D. D., Jones, B. & Mattingley, D. J. (eds.) *Farming the Desert: The UNESCO Libyan Valleys Survey*. Paris: UNESCO.) as well as in the Levant and Spain. This reflects the intense demand for olive oil from Imperial Rome. Incidentally, the statement at the top of page 4532 that Carroll et al. did not record *Olea* at Marsa, is erroneous - it was plotted with other cultivated taxa.

- The statement (page 4529, 23) that Carroll et al. (2012) recognised a rise of *Pinus* after 3900 cal. BP neglects their statement (pp.36-37) that the high *Pinus* in this site most probably follows a non-sequence and relates to the mid 19th Century when the British established pine plantations on Malta.

Production: The English is mostly of a high standard, but could do with a little proof-reading. I found the pollen diagrams rather difficult to read because of the small font and colours used, even in full-screen on a large monitor. Similarly, the climate curves in Fig 8 would be easier to understand if the x-axis was doubled in length.

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