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Comprehensive palaeomagnetic study of San Borja and Jaraguay monogenetic volcanic fields, Baja California (28–30ºN): considerations on latitudinal corrections

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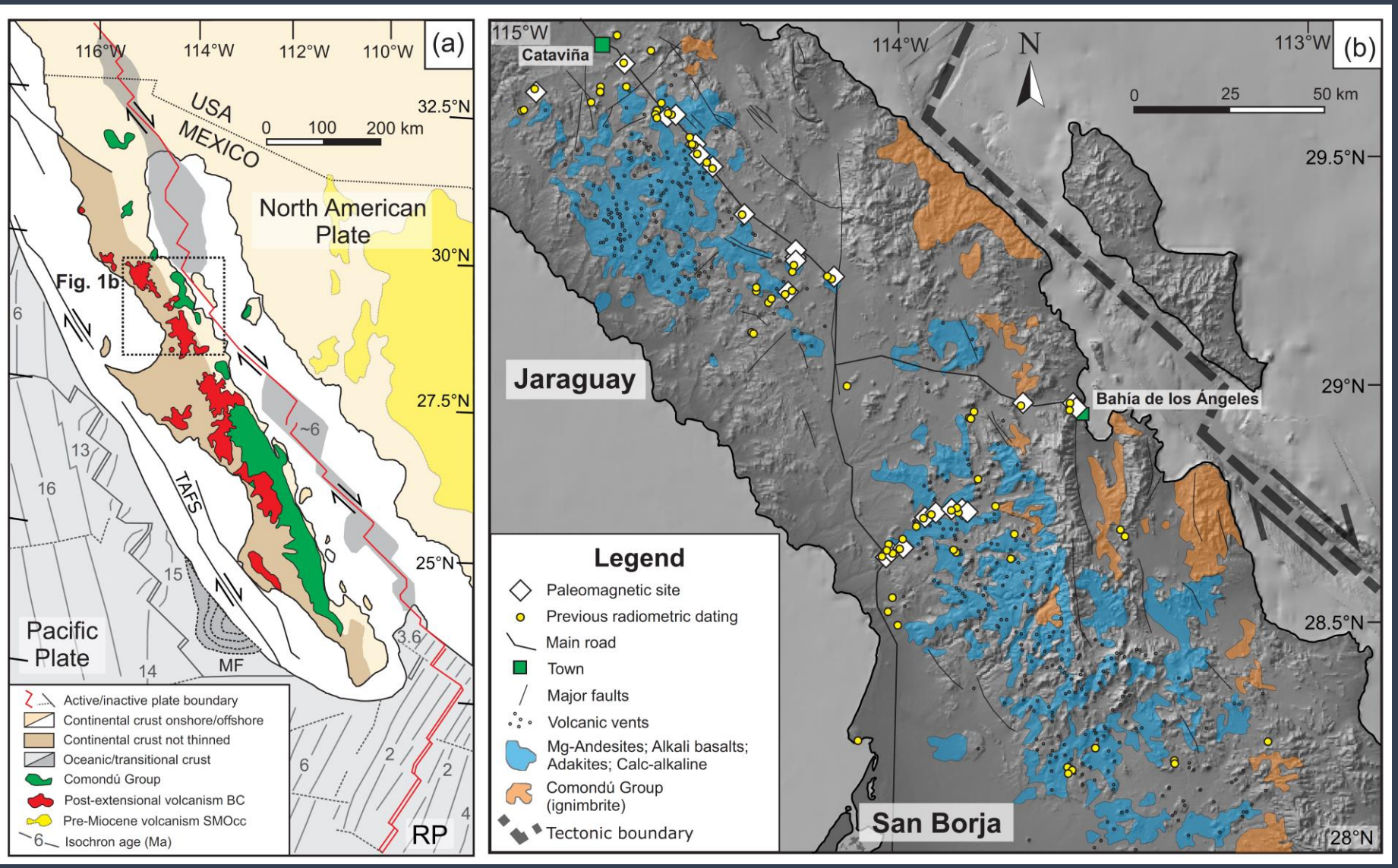
Objectives

I. Restoring, independently, palaeoposition of each thermal remanent magnetization data (TRMd) provided from Baja California.

II. Providing full-vector TRMd, after tectonic motion correction.

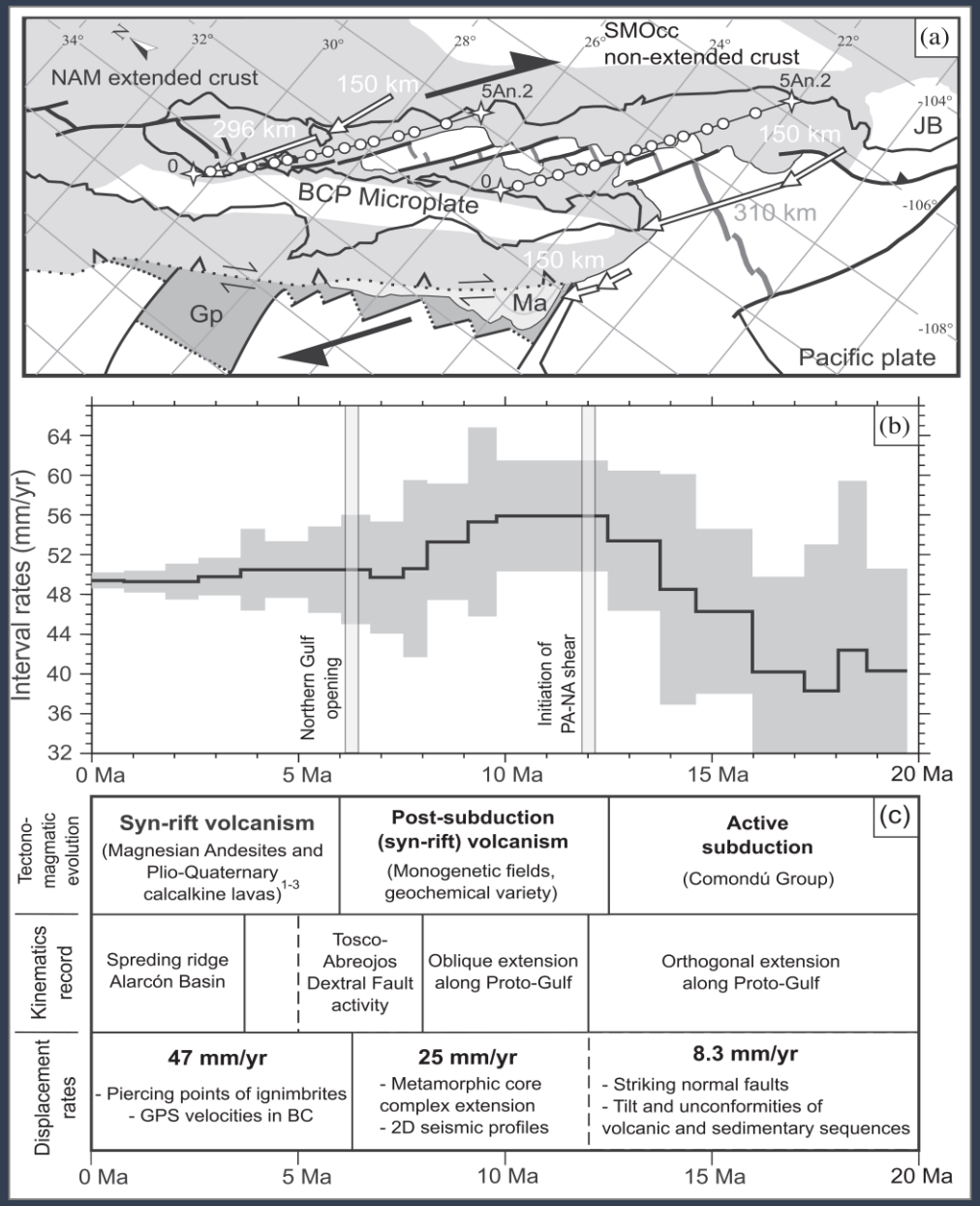
III. Investigating palaeosecular variation changes and palaeofield strength above Baja California Peninsula, during Pliocene and middle-late Miocene periods.

Restoring palaeoposition of each sampled site.



(a) main volcanic fields and geology of Baja California. (b) Location of the sampling sites

Restoring palaeoposition of each sampled site.

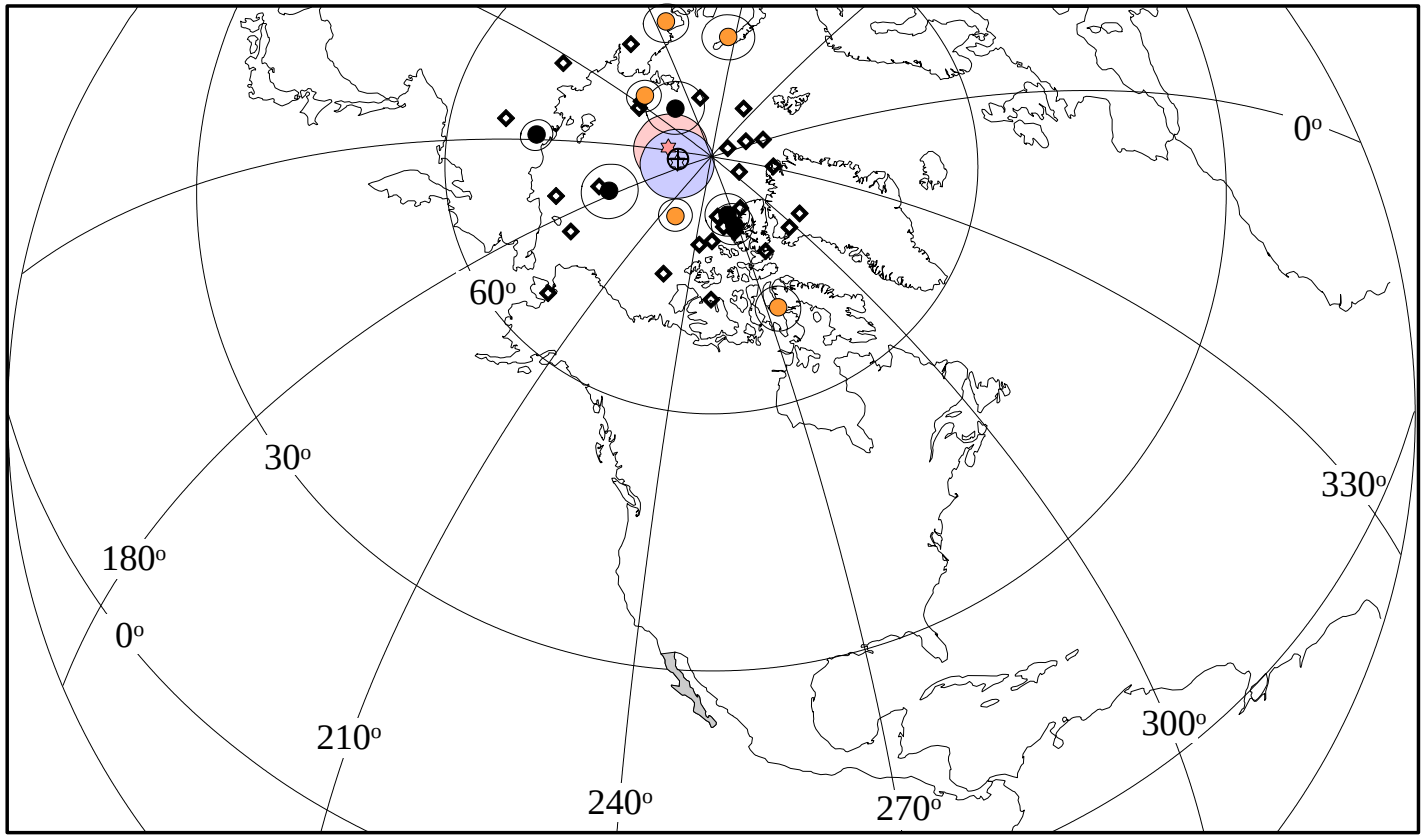


(a)Tectonic evolution with the kinematic record.

(b) Interval rates of Pacific–North America (PA–NA) since 20 Ma.

(c) Compilation of the tectono-magmatic evolution, kinematics record, and displacement rates of the BCP.

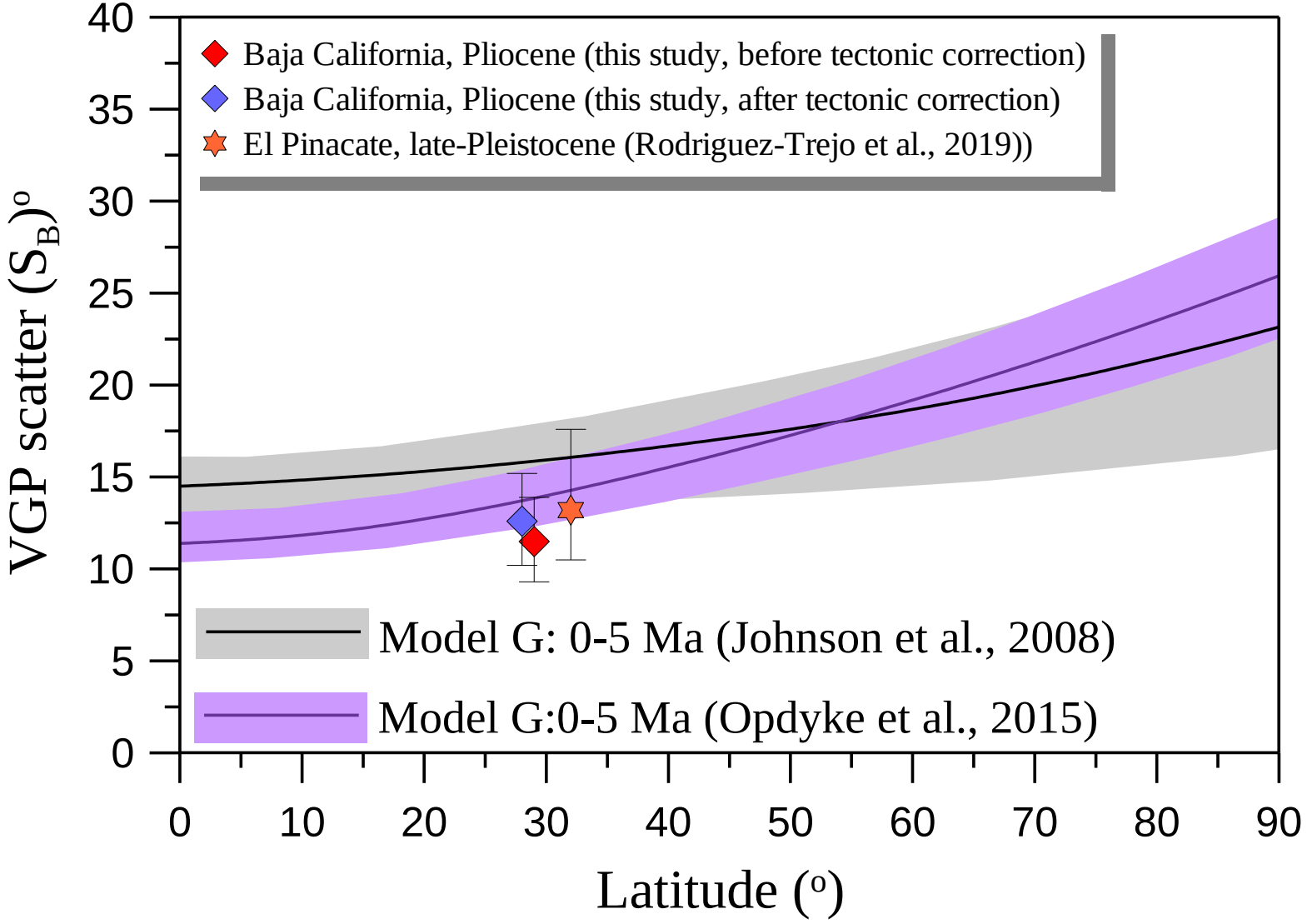
VGPs and palaeopole position: before and after tectonic correction



- ●VGPs (normal polarity, this study)
- ●VGPs (reverse polarity, this study)
- ◇VGPs (previous studies)
- ★ calculated paleopole *(before tectonic correction)*
- ★ calculated palaeopole *(after tectonic correction)*
- ⊕expected pole

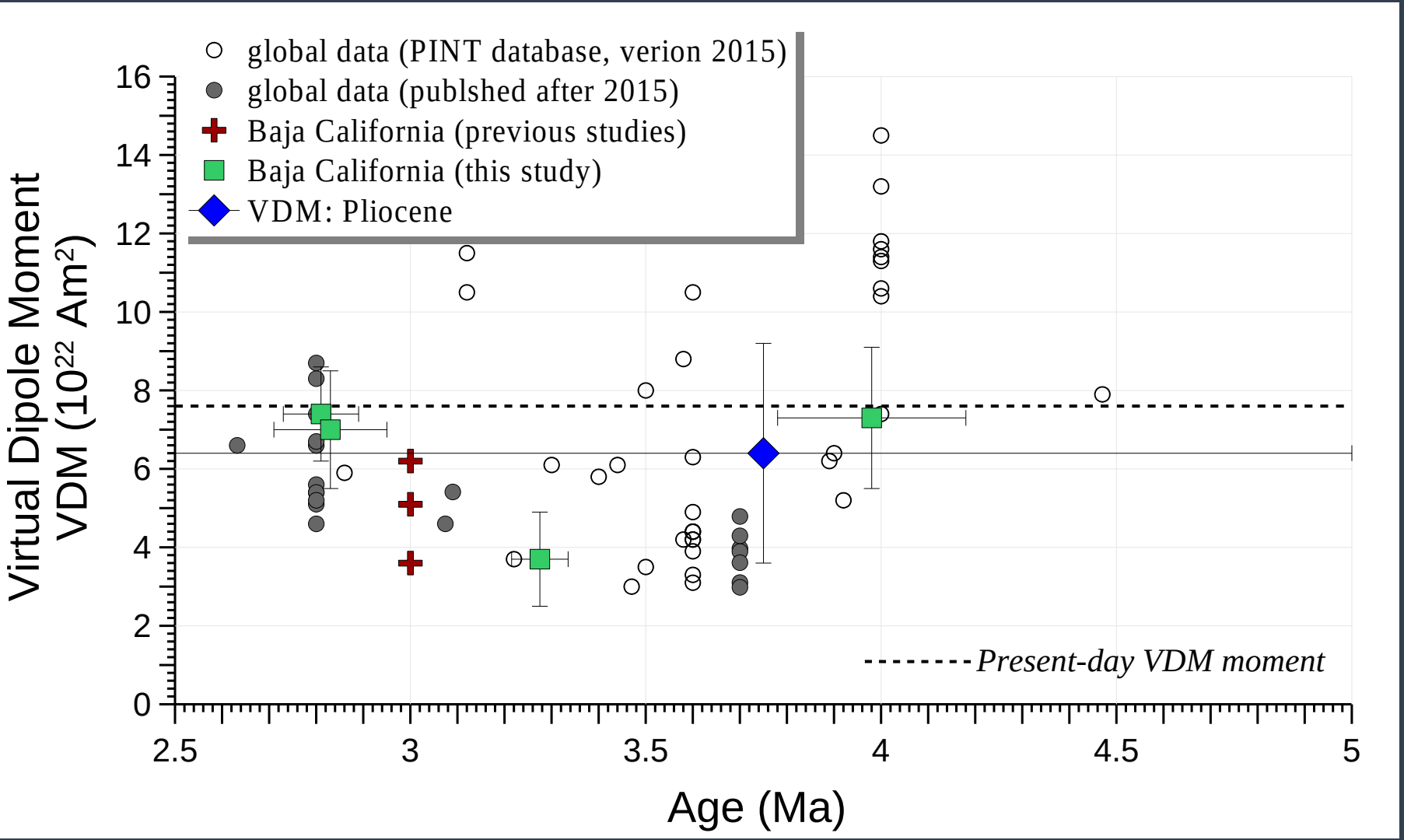
- Middle-Miocene Palaeopole position calculated after tectonic correction is located ***closer to expected*** pole, in comparison to uncorrected palaeopole.

Palaeosecular variation: before and after tectonic correction



- Latitudinal dependence of VGP scatter (S_B). Tectonic correction ***improves*** the S_B as it fits better with the expected model value.

Global evolution of VDMs over the past 5 Myrs.



- Variation of global virtual dipole moments (VDMs) data. Present-day VDM equals 7.6 $\times 10^{22}$ Am^2.

Conclusions

I. Pliocene palaeomagnetic pole, calculated after tectonic corrections, is not statistically different from expected North American reference pole.

II. The average middle-late Miocene corrected palaeopole is also compatible with the expected pole. Here, tectonic correction plays an important role in reducing the tilting from 2.7◦ to –0.8◦.

Conclusions

III. VGP scatter calculated after tectonic correction, is almost identical and are marginally concordant with Model G expected value ($15.1°^{15.9°}_{14.4°}$).

IV. During the Pliocene, VDM (= 6.4×10^{22} Am^2) was not, statistically different from the present-day dipole moment. In contrast, middle-late Miocene was characterized by weaker field strength (5.0×10^{22} Am^2).