

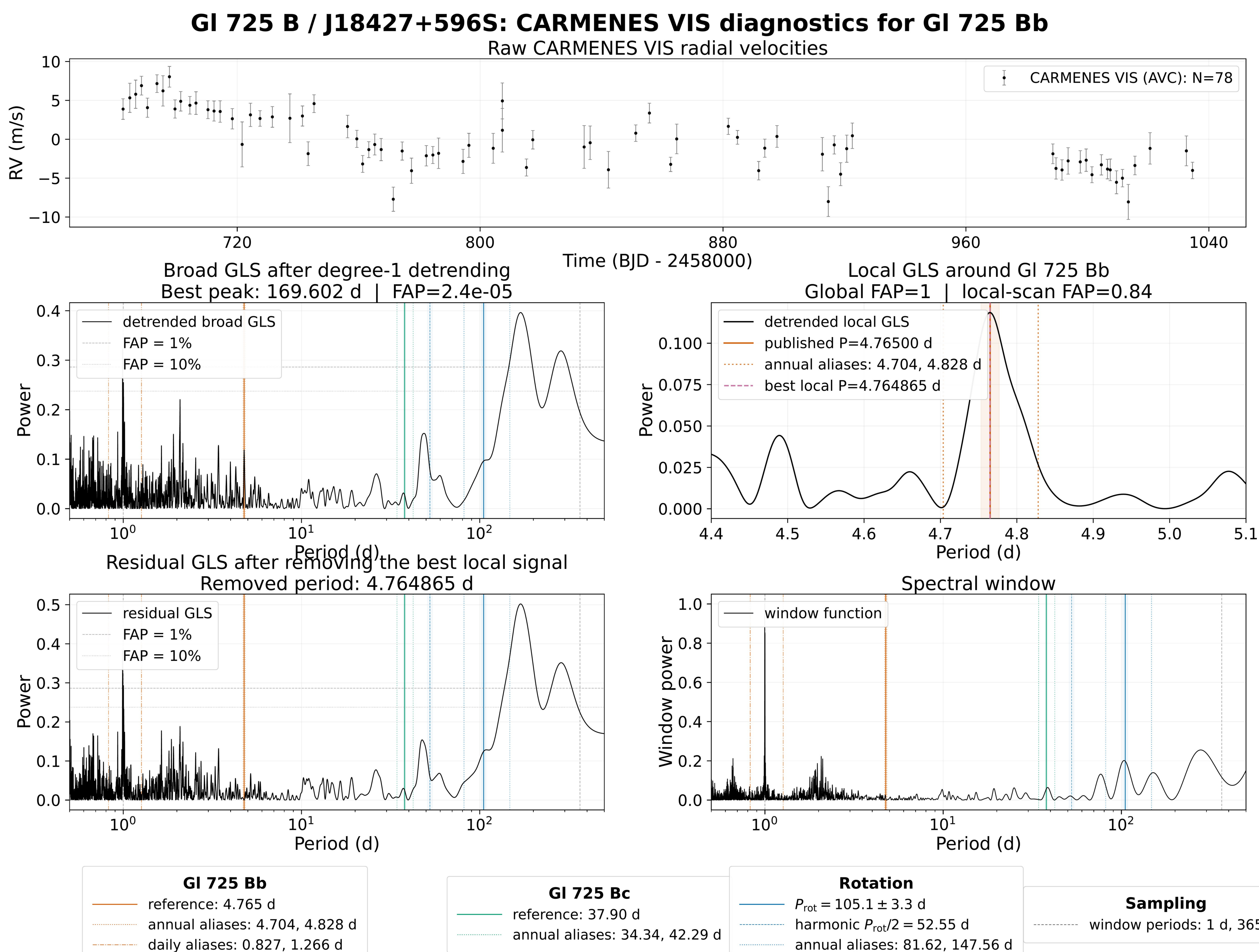
Independent CARMENES support for the 4.765 d exoplanet candidate GI 725 Bb

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ABSTRACT

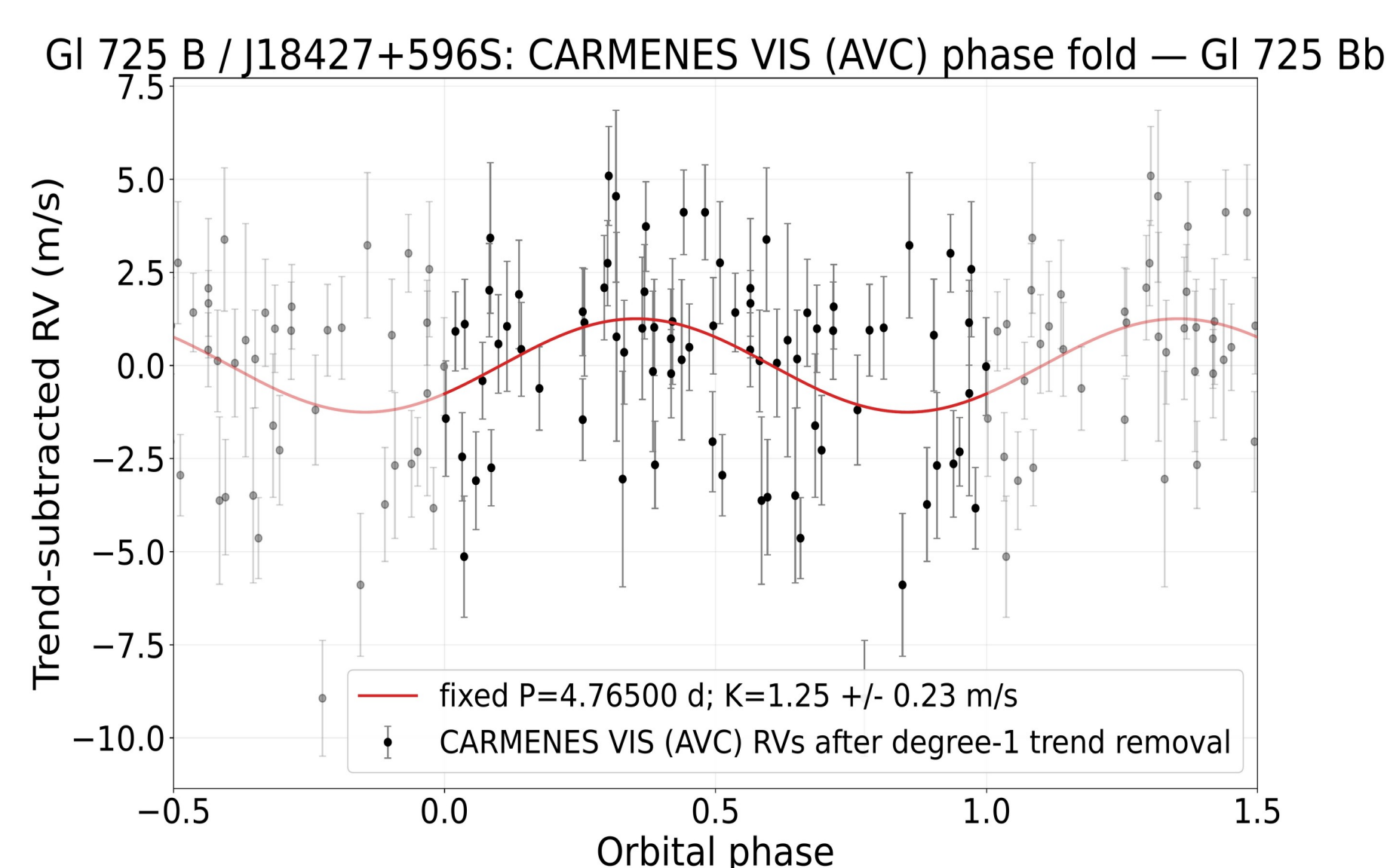
Using public optical CARMENES DR1² data, we test whether the reported SPIRou/WAPITI¹ signal is independently visible while accounting for sampling aliases and correlated stellar variability. A fixed-period fit recovers a compatible semi-amplitude. The statistical evidence is strongly noise-model dependent: a quasi-periodic GP in Kima⁵ is favoured, whereas an RV-only treatment is not. Injection–recovery demonstrates limited sensitivity at the published amplitude, so CARMENES provides supporting rather than standalone evidence.

Fig. 1. CARMENES VIS diagnostics



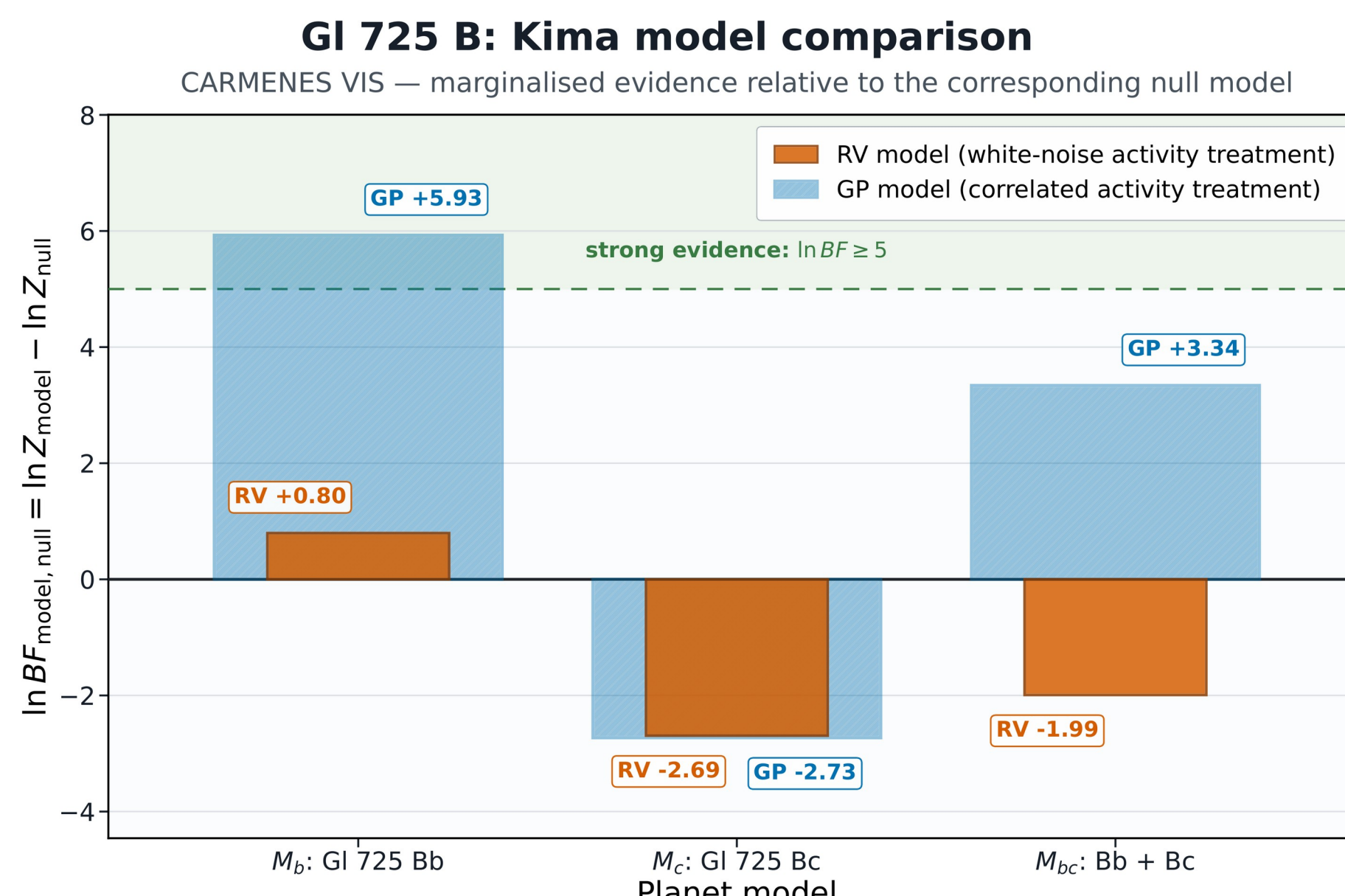
Raw radial velocities, detrended GLS⁴, local 4.765 d zoom, residual GLS⁴, and spectral window. Period axes increase from left to right.

Fig. 2. Fixed-period phase fold



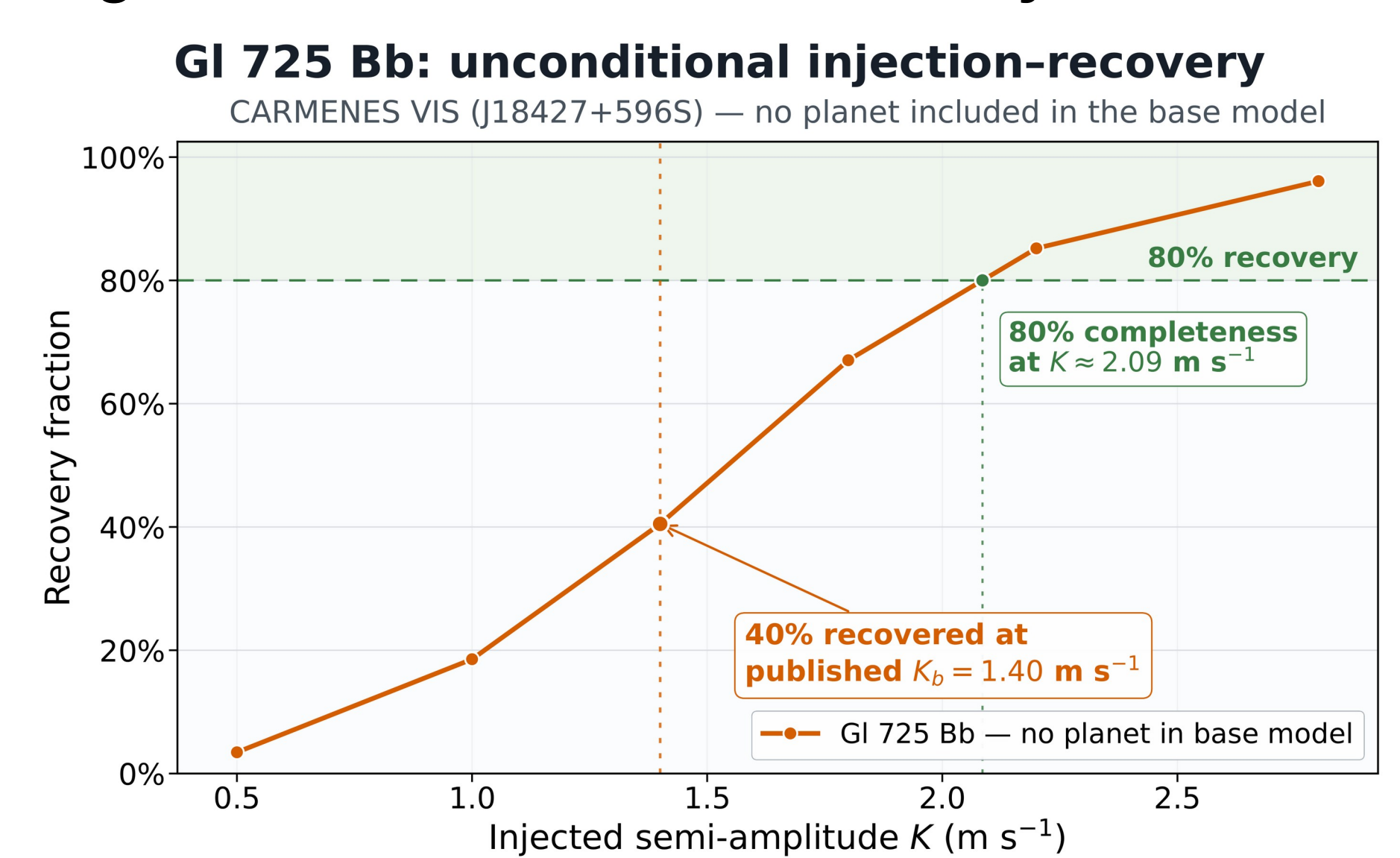
Trend-subtracted CARMENES DR1² radial velocities:
K = 1.25 ± 0.23 m s⁻¹, consistent with SPIRou/WAPITI¹.

Fig. 3. Marginalised evidence



Definition: $\ln \text{BF} = \ln Z_{\text{model}} - \ln Z_{\text{null}}$. Kima⁵ gives GP+Bb $\ln \text{BF} = 5.93$; RV-only Bb = 0.80.

Fig. 4. Unconditional detectability



Only ~40% of injected Bb signals are recovered at $K_b = 1.40$ m s⁻¹; 80% completeness is reached near $K \approx 2.09$ m s⁻¹.

CONCLUSION

- CARMENES DR1² VIS supports the 4.765 d signal, but does not confirm it alone.
- Candidate period and amplitude are recovered (Figs. 1–2).
- Strong evidence appears only with correlated stellar variability (Fig. 3).
- Detectability at the published amplitude remains limited (Fig. 4).

NEXT STEPS

- Joint CARMENES + HARPS-N + SPIRou fit with instrument-specific offsets and jitters.
- Test shared vs. instrument-specific activity GPs and wavelength consistency.
- Compare SERVAl³ with LBL/WAPITI¹ RVs.
- Map Kima⁵ evidence versus period-prior width and re-test aliases across seeds.

REFERENCES

- Ould-Elhkim et al. 2026, A&A 705, A234
- Ribas et al. 2023, A&A 670, A139
- Zechmeister et al. 2018, A&A 609, A12
- Zechmeister & Kürster 2009, A&A 496, 577
- Faria et al. 2018, JOSS 3, 487
- Cortés-Zuleta et al. 2025, A&A 693, A164

Status: GI 725 Bb remains a candidate; GI 725 Bc is confirmed in the SPIRou/WAPITI¹ analysis.