Fluxes and distributions of plant wax *n*-alkanes in the Ulleung Basin (East Sea)

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Introduction

In this study, we analyzed settling particles collected from March 2011 to February 2012 for long-chain *n*-alkanes and their stable carbon isotope ratio ($\delta^{13}C$) to investigate sources of terrestrial organic carbon in the Ulleung basin (East Sea). The settling particles were collected with 10 to 17-day intervals by using time-series sediment traps at 1000 m and 2300 m water depths.

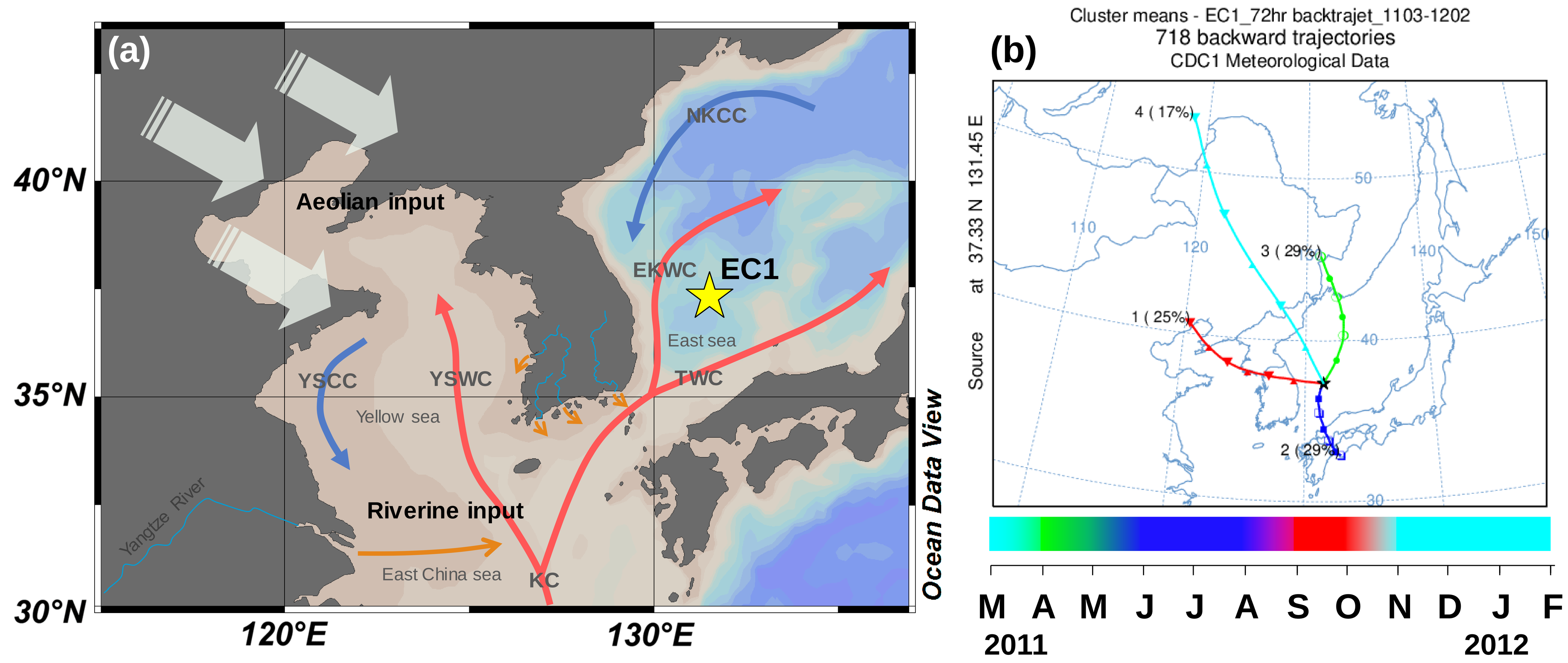

Fig. 1.
(a) Map showing the study site with the sediment trap position (EC1). The possible pathways of plant wax *n*-alkanes input to the trap site (EC1) in the Ulleung basin (East Sea) were also indicated.
(YSCC: Yellow sea cold current, YSWC: Yellow sea warm current, KC: Kuroshio current, TWC: Tsushima warm current, EKWC: East Korea warm current, NKCC: North Korea warm current)

(b) HYSPLIT cluster mean backward-trajectory for 72hr and their contribution to the trap site from March 2011 to February 2012.

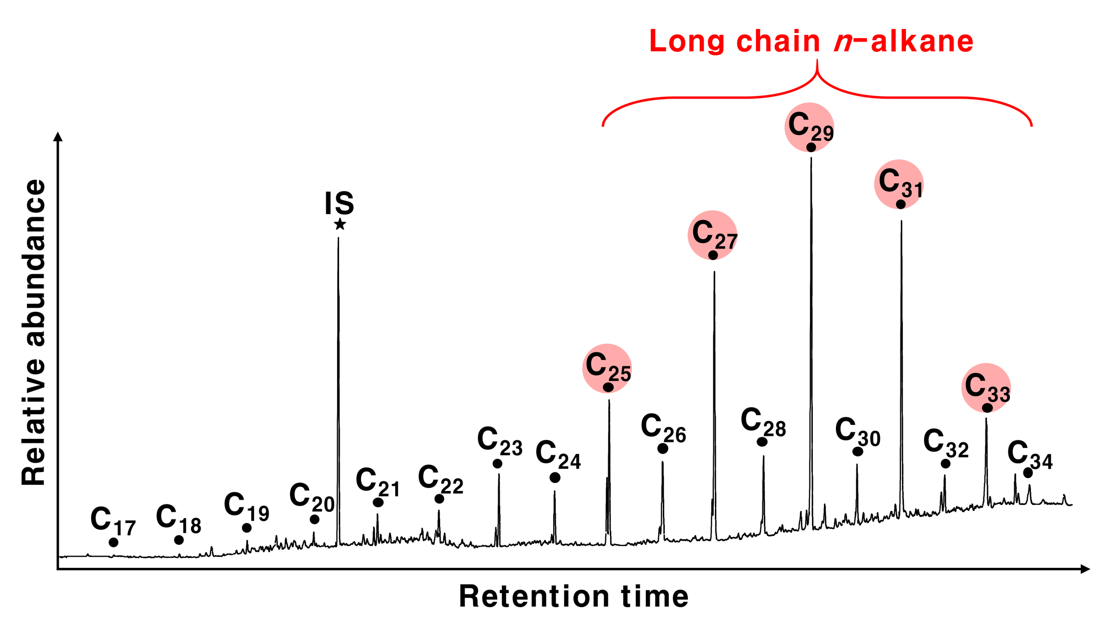

Fig. 2. An example of GC-FID chromatograms of *n*-alkanes (C_{17}-C_{34}) obtained from the sample EC1 2011/04/16_ 2300m.

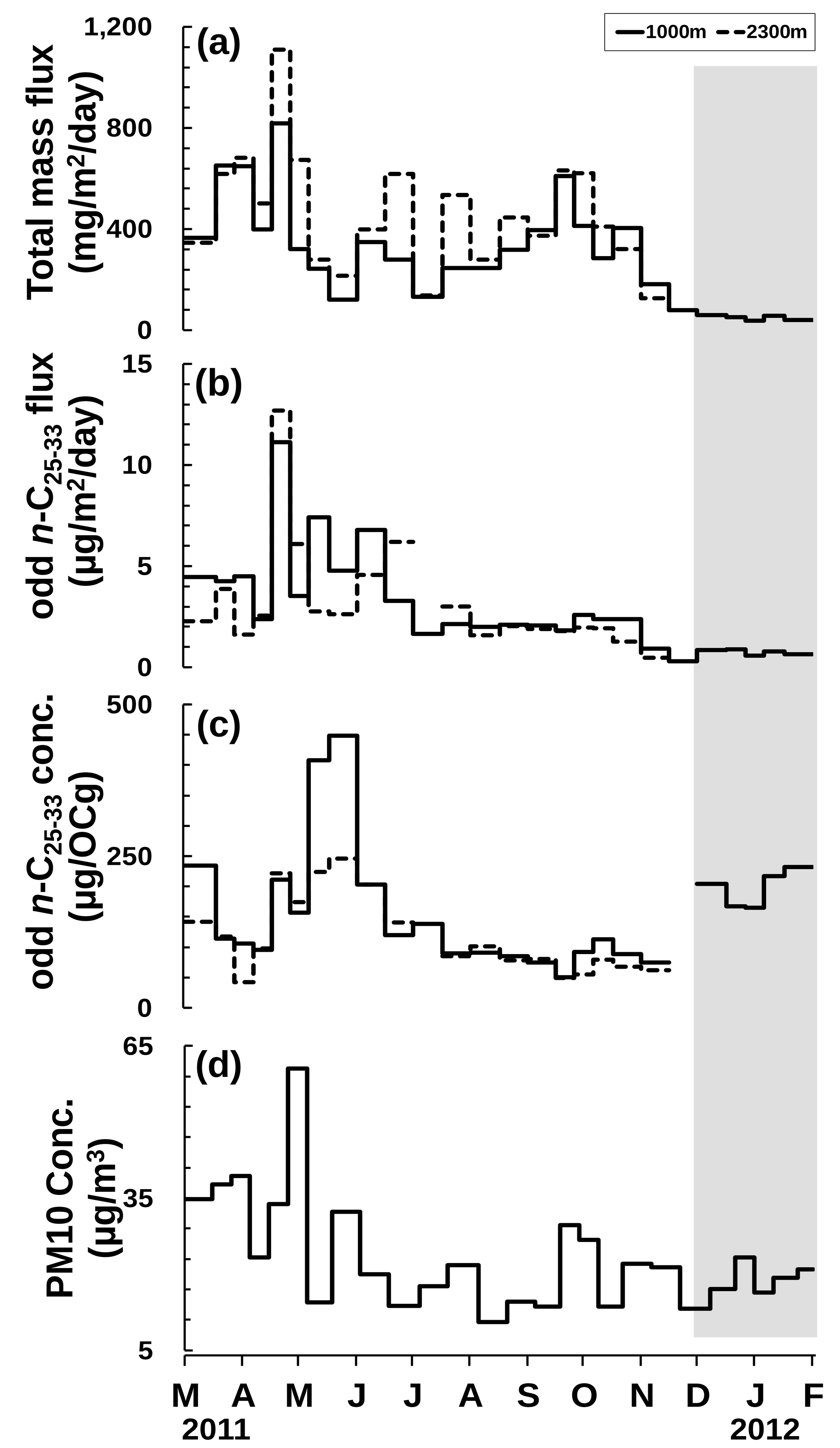

Fig. 3. Variation in (a) total mass flux (Kim et al., 2017), (b) odd *n*-$C_{25\text{-}33}$ flux, and (c) odd *n*-$C_{25\text{-}33}$ concentration in comparison to (d) PM10 concentration in the atmosphere obtained nearby the study site (data from the Korea Meteorological Administration).

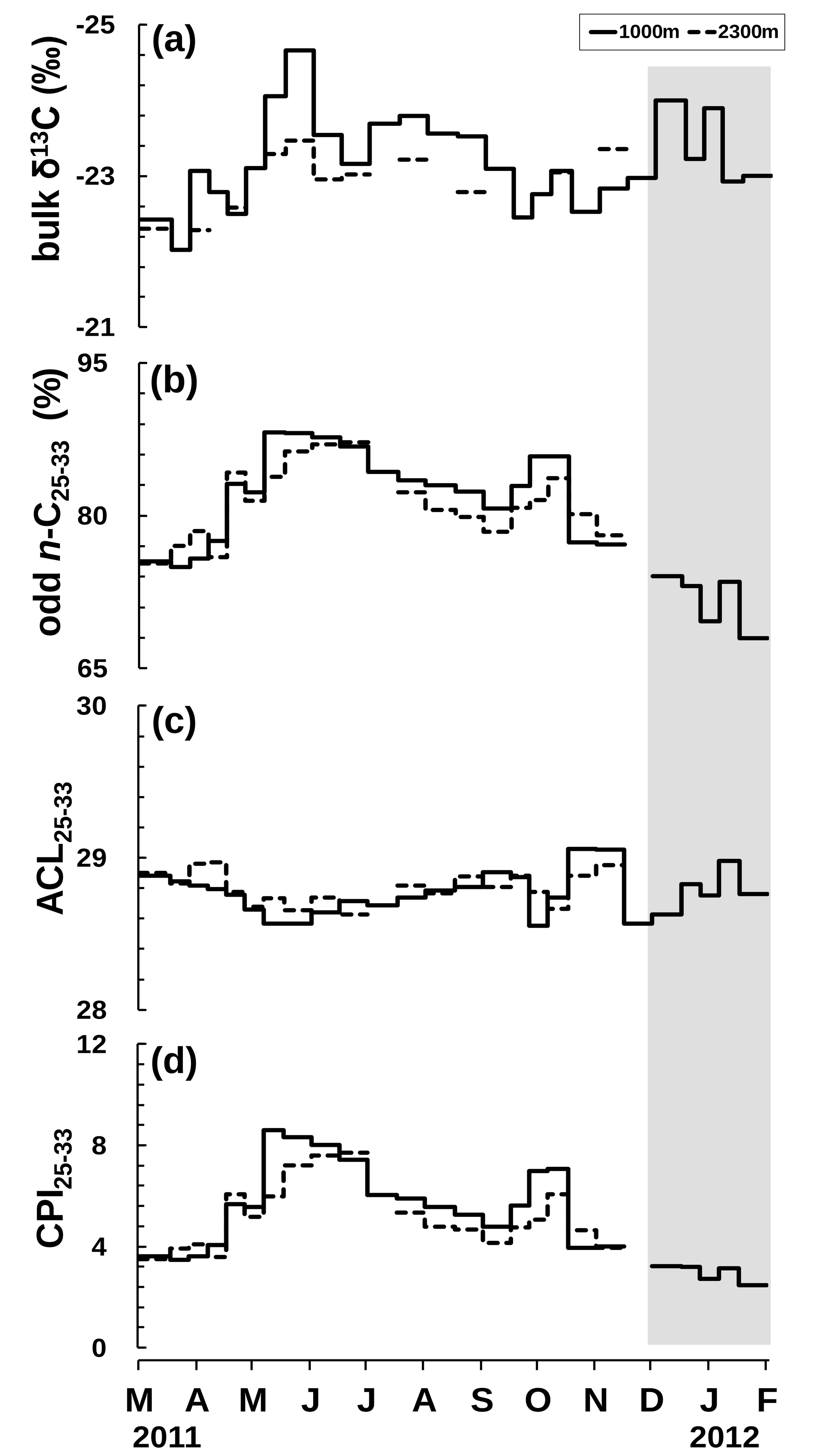

Fig. 4. Variation in (a) bulk $\delta^{13}C$ of POC (Kim et al., 2017), (b) percentage of odd *n*-$C_{25\text{-}33}$ relative to the total *n*-alkanes from C_{24} to C_{34}, (c) $ACL_{25\text{-}33}$, and (d) $CPI_{25\text{-}33}$. (The gray shaded box indicates unreliable data due to a sediment trap tilting.)

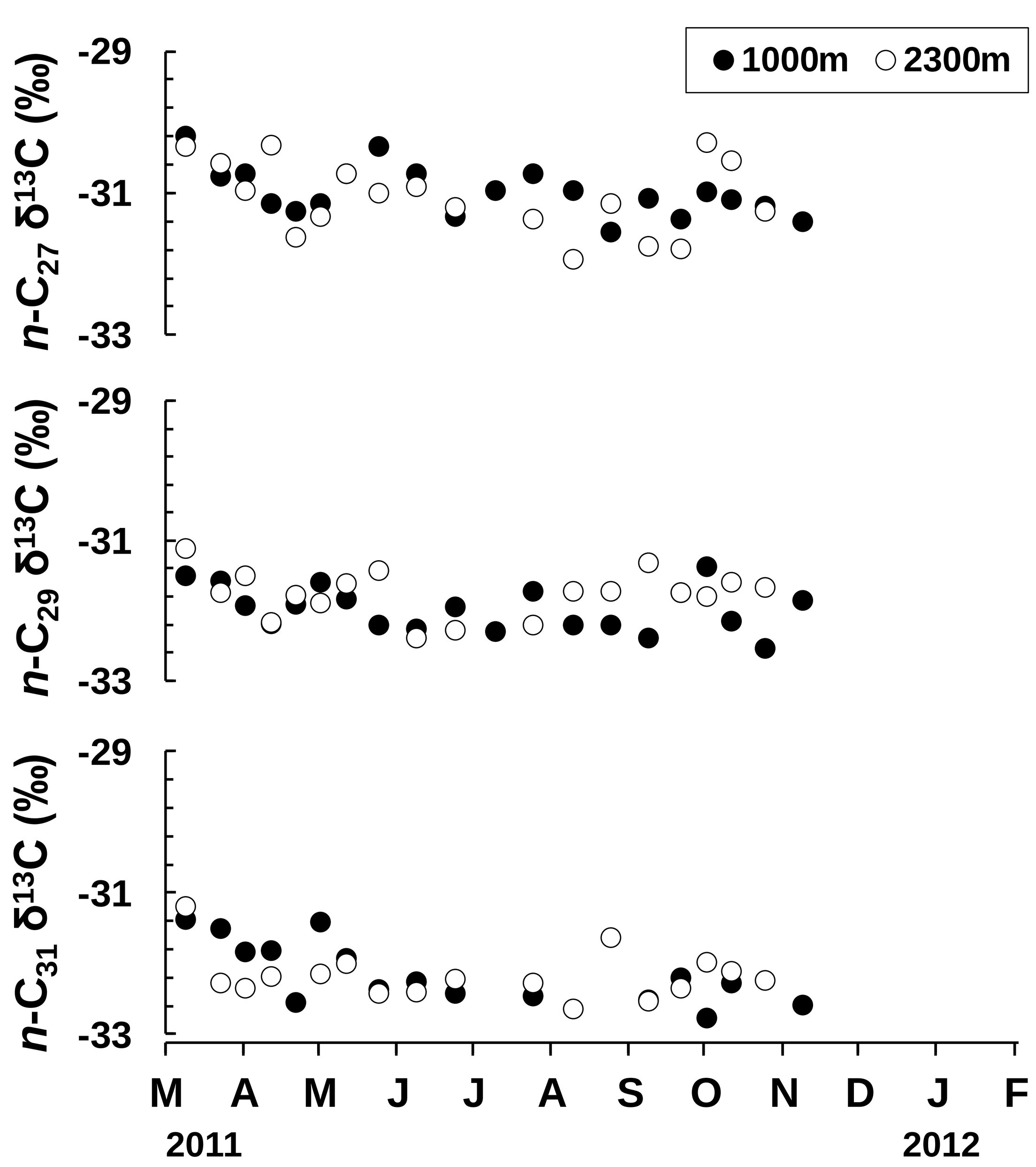

Fig. 5. Variation in $\delta^{13}C$ of *n*-C_{27}, *n*-C_{29} and *n*-C_{31}.

Conclusions

- The *n*-alkanes showed strong odd carbon number predominance with higher fluxes of long-chain *n*-alkanes. This suggests that terrestrial plant derived organic carbon is being deposited in the Ulleung Basin.
- The $CPI_{25\text{-}33}$ values suggest that the contribution of thermally matured petroleum-derived organic carbon to the particulate organic carbon pool is negligible.
- The $\delta^{13}C$ signatures of *n*-C_{27}, *n*-C_{29}, and *n*-C_{31} indicate a major contribution of C_3 plants as the main source of *n*-alkanes.

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TUESDAY POSTERS

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