



*Supplement of*

**Variations in export production, lithogenic sediment transport and iron fertilization in the Pacific sector of the Drake Passage over the past 400 kyr**

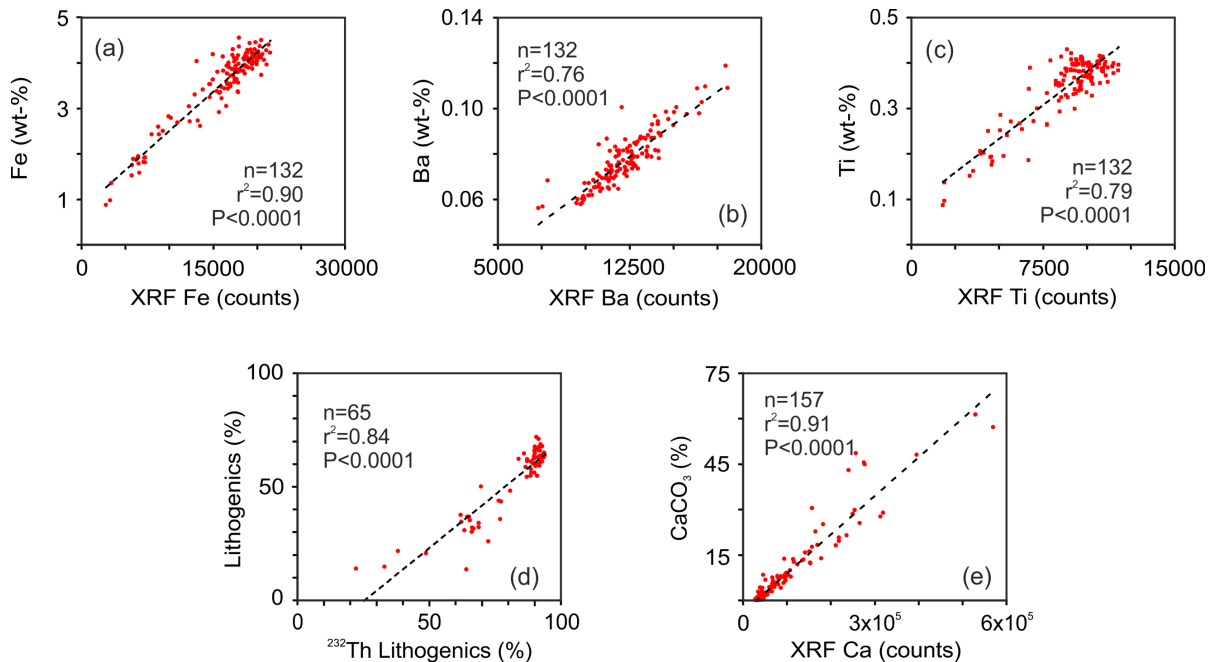
**María H. Toyos et al.**

*Correspondence to:* María H. Toyos (mtoyos@udec.cl)

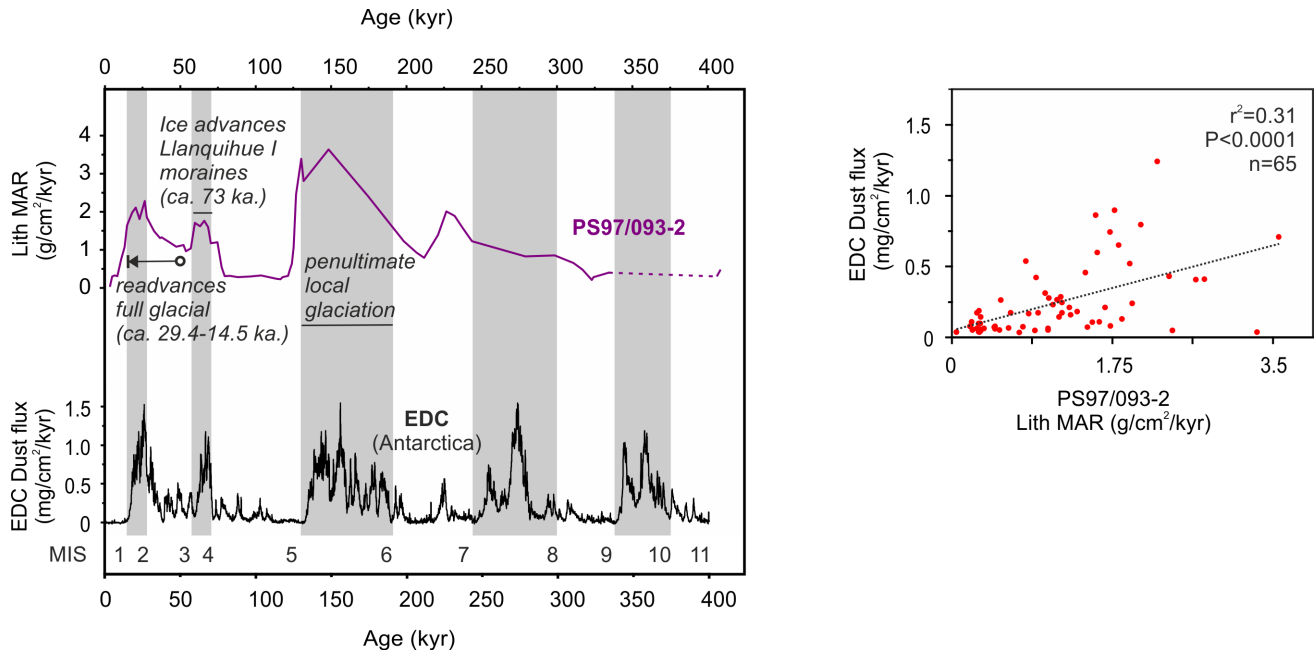
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**Table S1.** Correlation matrix between  $^{230}\text{Th}$ -normalized MARs of export production proxies and lithogenic indicators for core PS97/093-2.

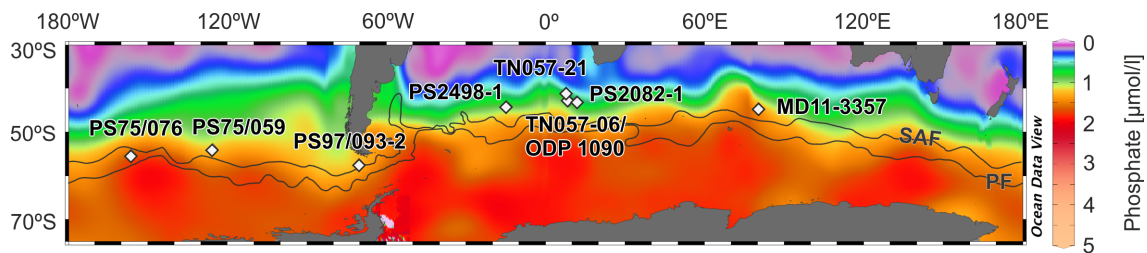
Litho. MAR ( $\text{g}/\text{cm}^2/\text{kyr}$ )	Lithogenic MAR ( $\text{g}/\text{cm}^2/\text{kyr}$ )					
<b>Fe MAR</b> ( $\text{mg}/\text{cm}^2/\text{kyr}$ )	$r^2=0.98$ $P<0.0001$ $n=60$	<b>Fe MAR</b> ( $\text{mg}/\text{cm}^2/\text{kyr}$ )				
<b>Ba<sub>exc</sub> MAR</b> ( $\text{mg}/\text{cm}^2/\text{kyr}$ )	$r^2=0.44$ $P<0.0001$ $n=60$	$r^2=0.46$ $P<0.0001$ $n=60$	<b>Ba<sub>exc</sub> MAR</b> ( $\text{mg}/\text{cm}^2/\text{kyr}$ )			
<b>TOC MAR</b> ( $\text{mg}/\text{cm}^2/\text{kyr}$ )	$r^2=0.81$ $P<0.0001$ $n=60$	$r^2=0.80$ $P<0.0001$ $n=60$	$r^2=0.48$ $P<0.0001$ $n=60$	<b>TOC MAR</b> ( $\text{mg}/\text{cm}^2/\text{kyr}$ )		
<b>Opal MAR</b> ( $\text{g}/\text{cm}^2/\text{kyr}$ )	$r^2=0.89$ $P<0.0001$ $n=60$	$r^2=0.85$ $P<0.0001$ $n=60$	$r^2=0.47$ $P<0.0001$ $n=60$	$r^2=0.57$ $P<0.0001$ $n=60$	<b>Opal MAR</b> ( $\text{g}/\text{cm}^2/\text{kyr}$ )	
<b>CaCO<sub>3</sub> MAR</b> ( $\text{g}/\text{cm}^2/\text{kyr}$ )	$r^2=0.11$ $P=0.009$ $n=60$	$r^2=0.10$ $P=0.009$ $n=60$	$r^2=0.03$ $P=0.128$ $n=60$	$r^2=0.02$ $P=0.208$ $n=60$	$r^2=0.04$ $P=0.059$ $n=60$	<b>CaCO<sub>3</sub> MAR</b> ( $\text{g}/\text{cm}^2/\text{kyr}$ )



**Figure S1.** a, b, c: Linear regressions between XRF and measured element concentrations (Fe, Ba, Ti) used to obtain high-resolution element content records. d: Linear regression between lithogenic content obtained by subtraction (Litho % =  $100 - [\text{CaCO}_3 \% + \text{opal \%} + (2 \times \text{TOC} \%)]$ ), and lithogenic content obtained by  $^{232}\text{Th}$  concentrations. e: Linear regression between XRF Ca and measured  $\text{CaCO}_3$  percentage used to obtain a high-resolution carbonate content record.



**Figure S2.** Left: Changes in  $^{230}\text{Th}$ -normalized Lithogenic MARs of core PS97/093-2 compared to dust fluxes in the EPICA Dome C ice core (Lambert et al., 2008). The inset texts indicate the chronology of the ice advances in Patagonia and Tierra del Fuego according to Rabassa (2008). Vertical grey bars mark glacial stages according to Lisiecki & Raymo (2005). Marine Isotope Stage (MIS). Right: Linear correlation between PS97/093-2 lithogenic MARs and EDC dust flux.



**Figure S3.** Southern Ocean average surface concentration of phosphate (data from Gouretski & Koltermann, 2004); Black lines indicate the modern location of the Subantarctic Front (SAF), and Polar Front (PF, Orsi et al., 1995); White diamonds indicate the core locations (PS75/076 and PS75/059, Lamy et al. 2014; PS97/093-2, this study; PS2498-1, TN057-21 and TN057-06, Anderson et al., 2014; ODP1090, Martínez-García et al. 2014; PS2082-1, Nürnberg, 1997 and Frank, 2002; MD11-3357, Thöle et al., 2019).

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