Half-precession signals in marine an terrestrial records – connecting IODP/ICDP sites from the equatorial Atlantic to Greenland

Arne Ulfers, *Christian Zeeden, Silke Voigt, Mehrdad Sardar Abadi, Thomas Wonik*

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IODP INTERNATIONAL OCEAN DISCOVERY PROGRAM

ECORD EUROPEAN CONSORTIUM FOR OCEAN RESEARCH DRILLING

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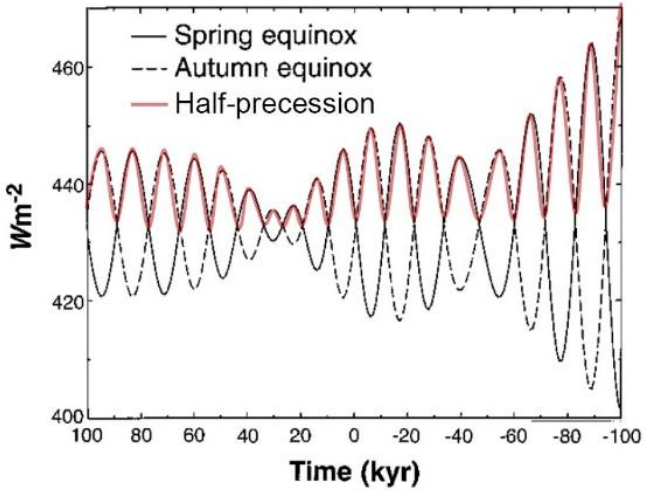
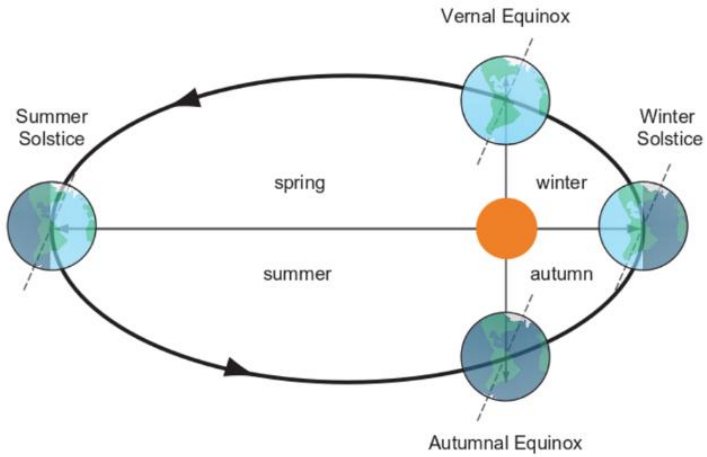
Half-precession (HP) cycles

- Investigations of half-precession (HP) cycles have been given a subordinate role in previous studies.
- Several studies describe HP as tropical/equatorial signal.
- Origin of HP in equatorial regions as a result of the two insolation maxima per precession cycle (~9,000 - 12,000 years) .
- An analogue is the passage of the sun above the equator twice per year during the vernal and autumnal equinoxes.



Modified from Berger and Loutre, 1997.



Cyclostratigraphy.org

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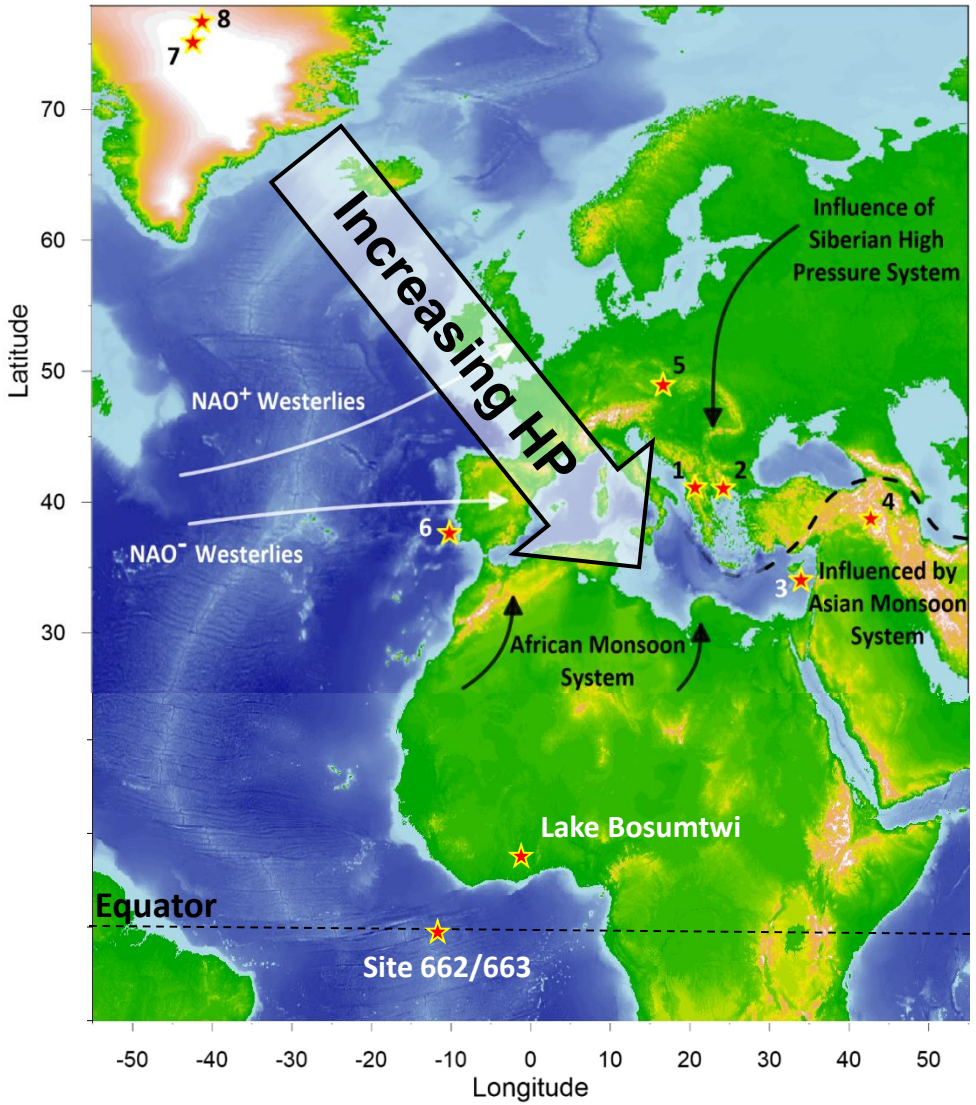
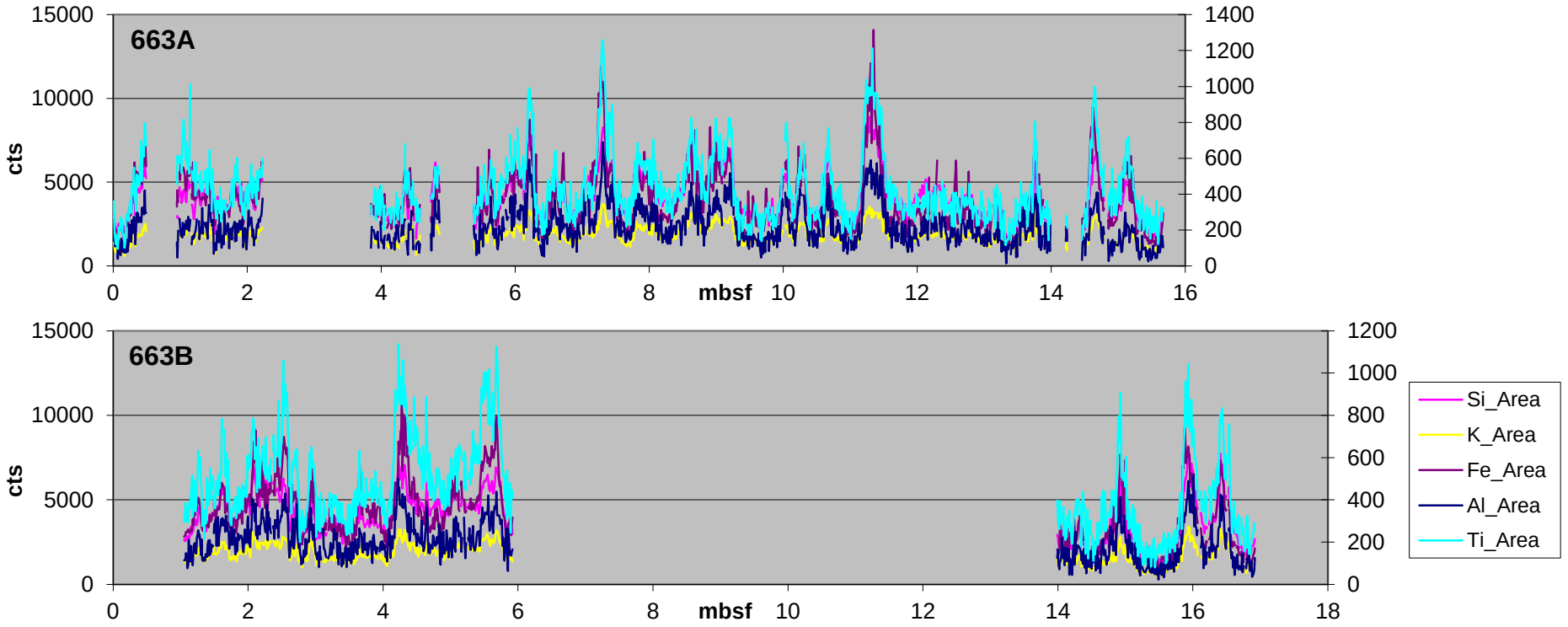


- For Europe, we showed that HP is stronger in records from the south.
- But the signal is still very weak.
- Next step is to investigate (probably stronger) HP signal in low latitudes.
- Records from Site 662/663 at equator will help to solve the issue.
- For Lake Bosumtwi: Upcoming presentation by C. Zeeden et al. (EGU22-10406)

XRF-data from Site 663A and 663B

- First phase of the project aims to scan the upper ~30 m (~0.9 Ma) ➔ in progress.
- Second phase down to ~190 m (~3.5 Ma) covering the MPT and the PPT ➔
  ➔ DFG proposal submitted.
- High-resolution scanning (1 cm) of several elements: e.g. Ca, Fe, Ti, Sr, Ba.



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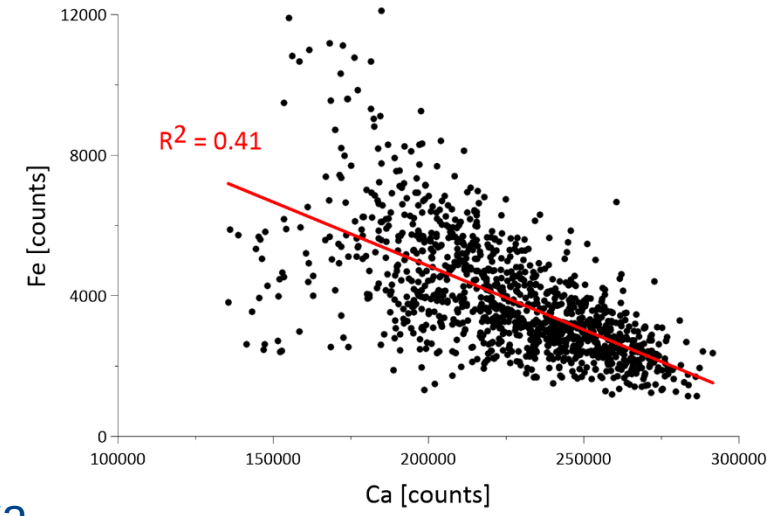
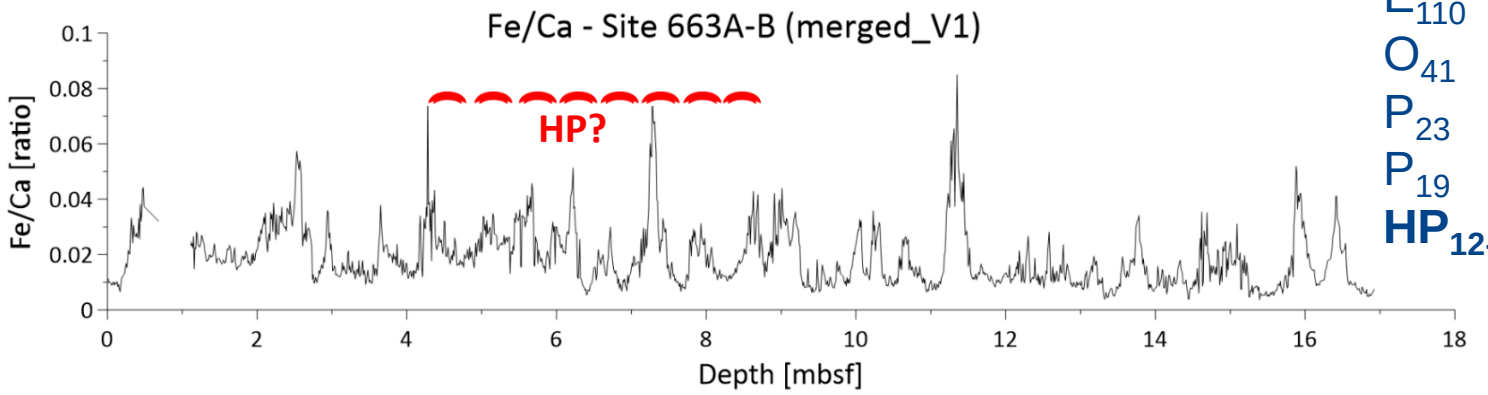
XRF-data from Site 663A and 663B

- Fe/Ca can be indicator for bioproductivity and terrigenous input.
- Splicing the data from Site 663 A and B results in (almost) continuous record.



- Approx. sedimentation rate = 4.1 ± 1.1 cm/ka
  ➔ The complete ~17 m cover ~400 kyr
  ➔ One HP cycle (9-12 kyr) is 37 - 50 cm



E_{400}	16.4 m
E_{110}	4.5 m
O_{41}	1.7 m
P_{23}	0.9 m
P_{19}	0.7 m
$HP_{12\text{-}9}$	**50 - 37 cm**

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Thank you for
your attention

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