

Age modeling in Neptune Sandbox Berlin

Johan Renaudie & David Lazarus

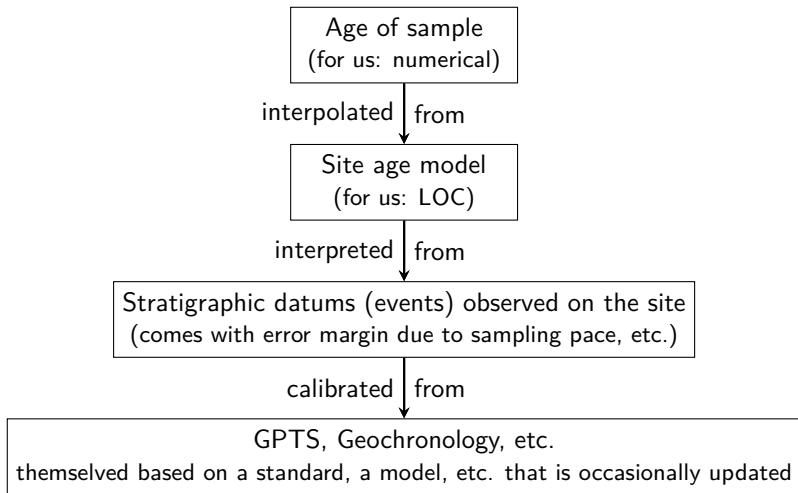
Museum für Naturkunde, Berlin

2022-04-21

NSB goals

- Domain target is pelagic marine sediment record
- Originally with only paleobiologic - marine micropaleo goals (1990's at ETH-Zürich)
- Addition of pelagic marine chronostratigraphy goals, in support of EU Earthtime project (2014-15)
- Current stratigraphic layer designed to support pelagic marine chronostratigraphy
 - focus still on biostratigraphic data
 - future developments within above goals - better support for e.g. cross-hole integration, alternate depth scales, paleomag etc.
- Other domains e.g. classic named geologic age intervals, cyclostratigraphy, radiometric ages not (yet) targets, or explicitly planned for implementation
- In addition to DB, NSB ecosystem for chronostratigraphy includes ADP data integration program.

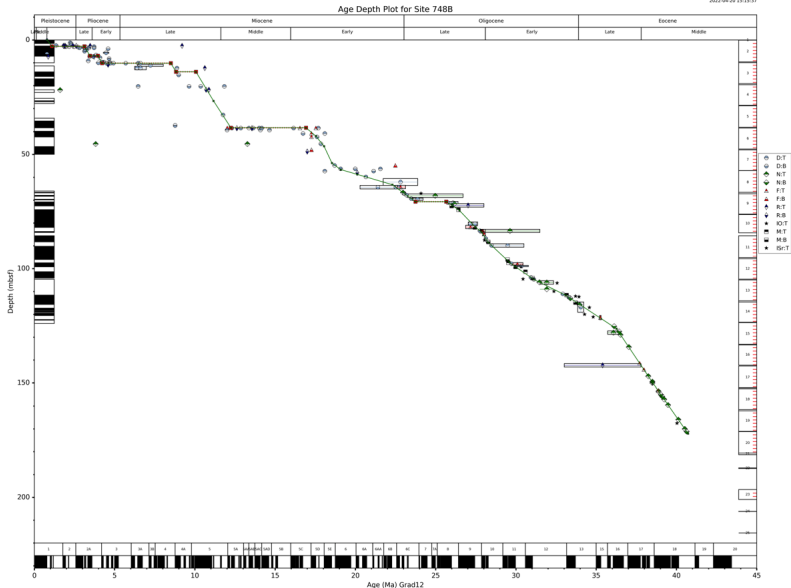
Keeping track of stratigraphic information



Age comes with lots of baggage as a whole chain of metadata: any link in the chain can (and will) change, and the changes need to ripple to the end product.

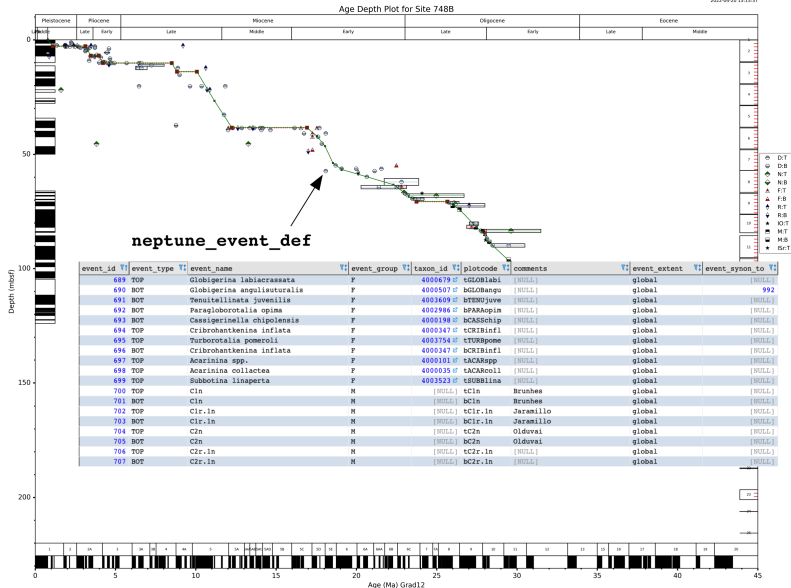
Age-depth plot as starting point

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Event definitions

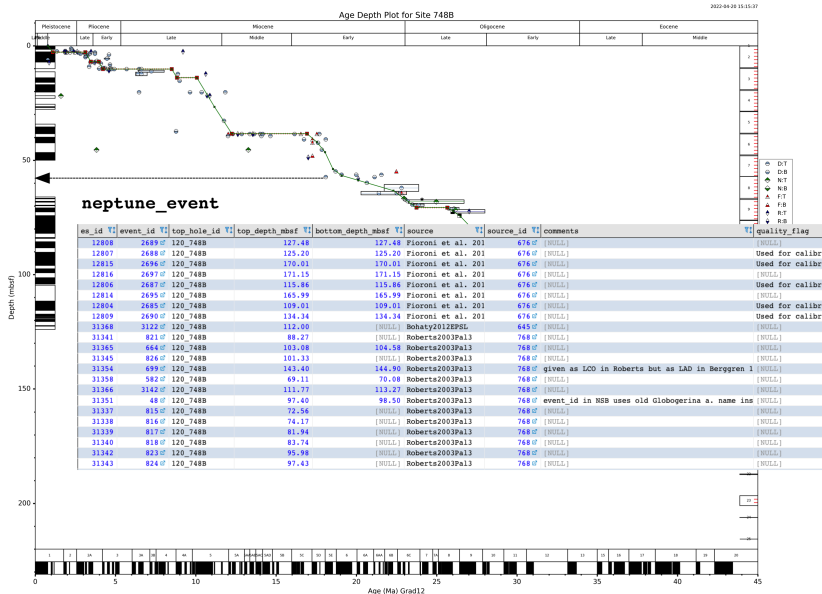
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Strat. MGB

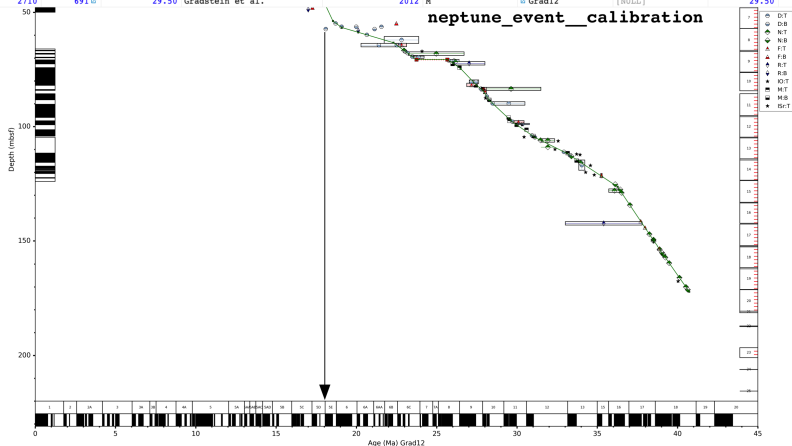
LOC MGB revision 3

Events as observed on site



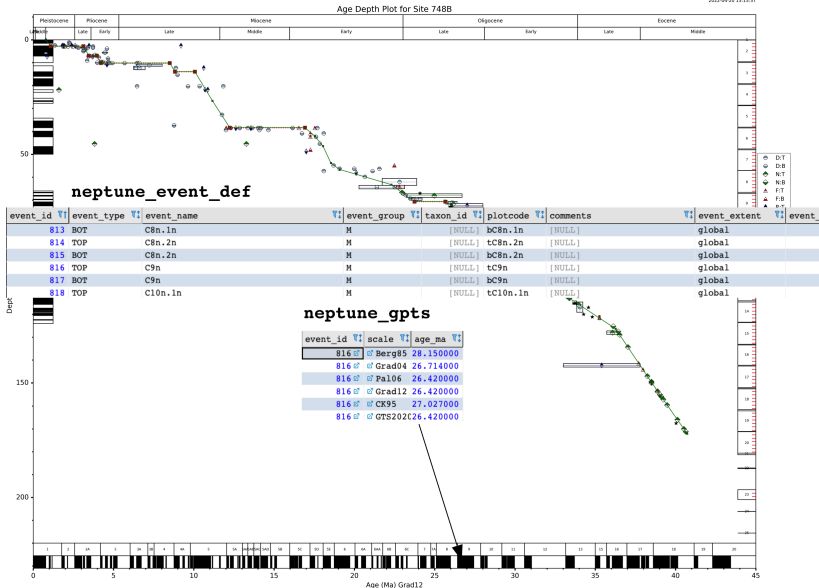
Documented values and basis for assigned event ages

bration_id	event_id	young_age_ma	calibration_source	calibration_year	calibration_type	calibration_scal	comments	old_age_ma	source_i
672	683	65.1	Sanfilippo & Nigrini	1998		CK95	based on Hollis 19	[NULL]	7
2703	684	14.89	Gradstein et al.	2012	M	Grad12	[NULL]	14.89	6
2704	685	19.30	Gradstein et al.	2012	M	Grad12	[NULL]	19.30	6
2705	686	20.78	Gradstein et al.	2012	M	Grad12	[NULL]	20.78	6
2706	687	21.31	Gradstein et al.	2012	M	Grad12	[NULL]	21.31	6
2848	688	22.497	744-748 projected Paleogene	2020	M	Grad12	published events, :	23.125	6
2707	688	23.03	Gradstein et al.	2012	M	Grad12	[NULL]	23.03	6
2869	689	26.874	744-748 projected Paleogene	2020	M	Grad12	published events, :	27.465	6
2708	689	26.52	Gradstein et al.	2012	M	Grad12	[NULL]	26.52	6
2709	690	29.18	Gradstein et al.	2012	M	Grad12	[NULL]	29.18	6
2710	691	29.50	Gradstein et al.	2012	M	Grad12	[NULL]	29.50	6



GPTS and magnetostratigraphy

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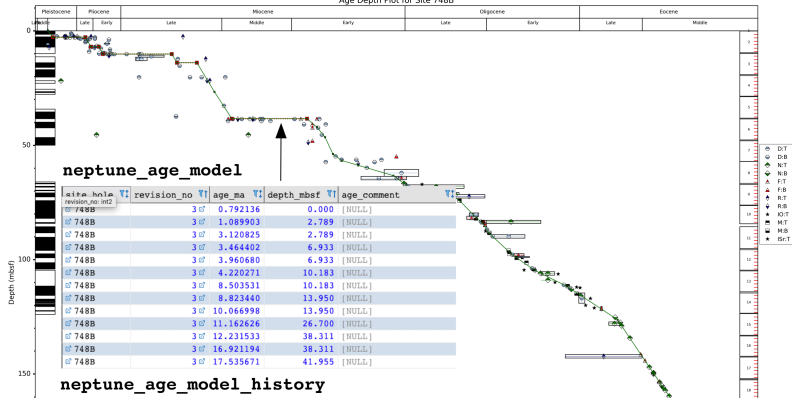
Strat. MGB

LOC: MGB revision 3

Line of Correlation

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Age Depth Plot for Site 748B



neptune_age_model_history

site hole	revision_no	age_quality	interpreted_by	date_worked	current_flag	remark
748A	0	P	ETH/Lazarus	1991-07-18	Y	Qest by dbl. Just top 2 cores of same section as 748B, same problems.
748B	0	P	ETH/Lazarus	1995-08-01	N	Qest by dbl. Condensed section w. multiple poorly defined hiatuses, high
748B	1	G	lazarus	2020-02-18	N	provisional update to fit curve to newer calibrations since ETH - dbl
748B	2	G	lazarus	2020-02-24	N	with new pmag pol and pmag picks of Roberts 2003, still old bstrat of ETH
748B	3	G	lazarus	2020-02-27	Y	Qest dbl. Paleogene same as v2 (new compil 2020 mostly Roberts 2003), Neo
748C	0	VP	ETH/Lazarus	1995-07-23	Y	Qest by dbl. Low data density, scatter, very poor core recovery, virtual
749B	0	VP	ETH/Lazarus	1995-07-23	N	Qest by dbl. Low data density, scatter, poor core recovery in lower part.
749B	1	P	lazarus	2021-08-28	Y	Qest dbl. Now with full pf, n data from SR vol. Better control but still
751A	0	VG	ETH/Lazarus	1995-08-01	Y	Qest by dbl. Age model in NSB still 1995, plot shows very high data densi



Stratigraphic layer

neptune_age_model_history

site_hole
revision_no
age_quality
f_priority
n_priority
d_priority
r_priority
interpreted_by
date_worked
current_flag
remark

neptune_age_model

site_hole
revision_no
depth_mbsf
age_ma
age_comment

sample ages
interpolated
from

toward site
metadata

line of
correlation
calculated from

neptune_calibration_sites

calibration_id
es_id

neptune_event_calibration

calibration_id
event_id
young_age_ma
old_age_ma
calibration_source
calibration_year
calibration_type
calibration_scale
comments

neptune_event

es_id
event_id
top_hole_id
sample_top
top_depth_mbsf
bottom_hole_id
sample_bottom
bottom_depth_mbsf
source
quality_flag
comments

neptune_event_def

event_id
event_type
event_name
event_group
taxon_id
plotcode
comments
event_extent
event_synon_to

toward
taxonomy tables

neptune_gpts

event_id
scale
age_ma

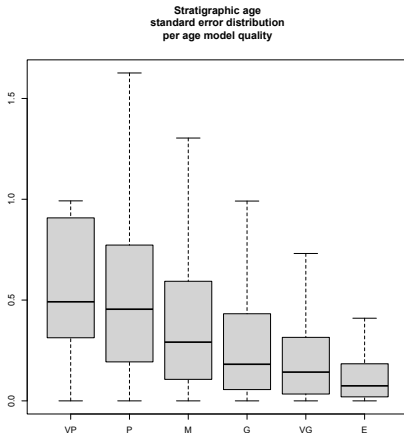
neptune_gpts_def

scale
long_name
comments

Conclusion

Result is a system where (most of) the chain of metadata behind a sample age assignment is preserved, thus allowing constant reevaluation as soon as any link of the chain is recalibrated, recalculated or as soon as new observations are made.

Also allow more objective quality assessment of age estimates.



Additional information

Access to the Database:

Website: <http://nsb.mfn-berlin.de>

Username: guest

Password: arm_aber_sexy

For direct PostgreSQL connection:

Host: 212.201.100.111

Port: 5432

Database name: nsb

NSB_ADP_wx: http://github.com/plannapus/nsb_adp_wx/releases

Renaudie, J., Lazarus, D.B., Diver, P. (2020) NSB (Neptune Sandbox Berlin): an expanded and improved database of marine planktonic microfossil data and deep-sea stratigraphy. *Palaeontologia Electronica*, 23(1):a11.