

UNIVERSITÀ  
DEGLI STUDI  
DI PADOVA



DIPARTIMENTO  
DI GEOSCIENZE

# Analisi degli isotopi del carbonio su materia organica attorno al limite Norico/Retico della Tetide Occidentale

Laurea triennale in Scienze Geologiche  
A.A. 2019/2020

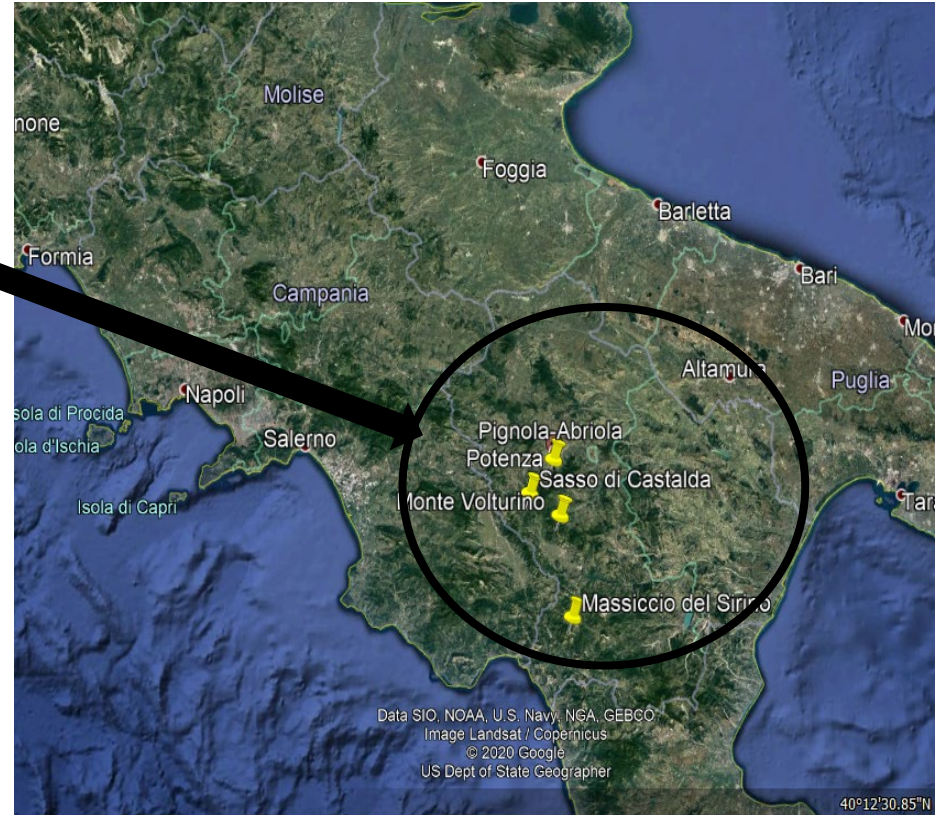
Laureando: Cicalini Nicola, 1164447  
Relatore: Prof. Manuel Rigo

## SCOPO DELLA TESI

- Indagine chemostratigrafica del  $\delta^{13}\text{C}_{\text{org}}$  su campioni di sezioni della Tetide Occidentale attorno al limite tra Norico e Retico (205,7Ma).
- Correlazioni biochemiostratigrafiche per individuare il limite N/R

# BACINO LAGONEGRO

Affiora nell'Appennino meridionale

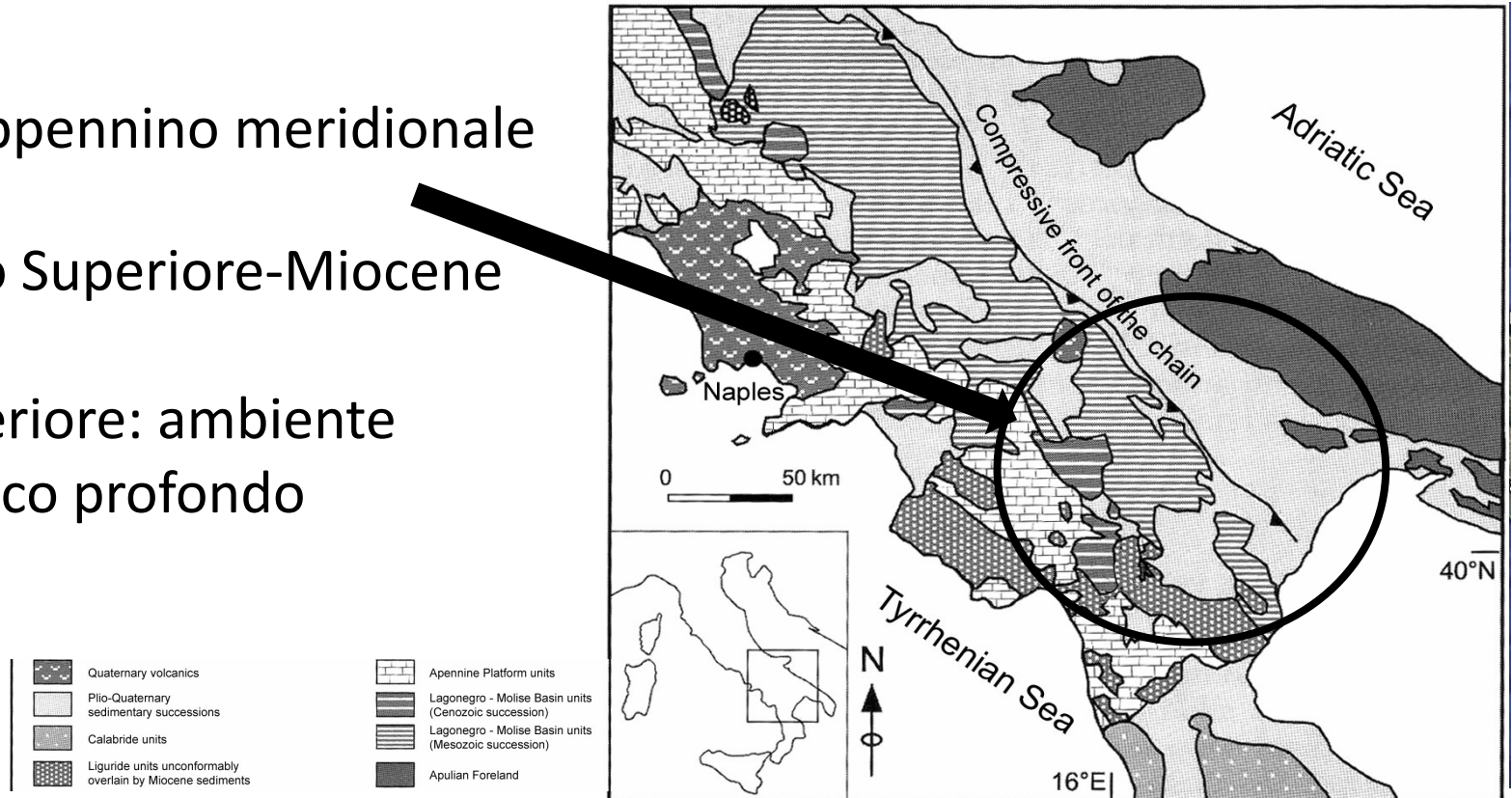


# BACINO LAGONEGRO

Affiora nell'Appennino meridionale

Età: Permiano Superiore-Miocene

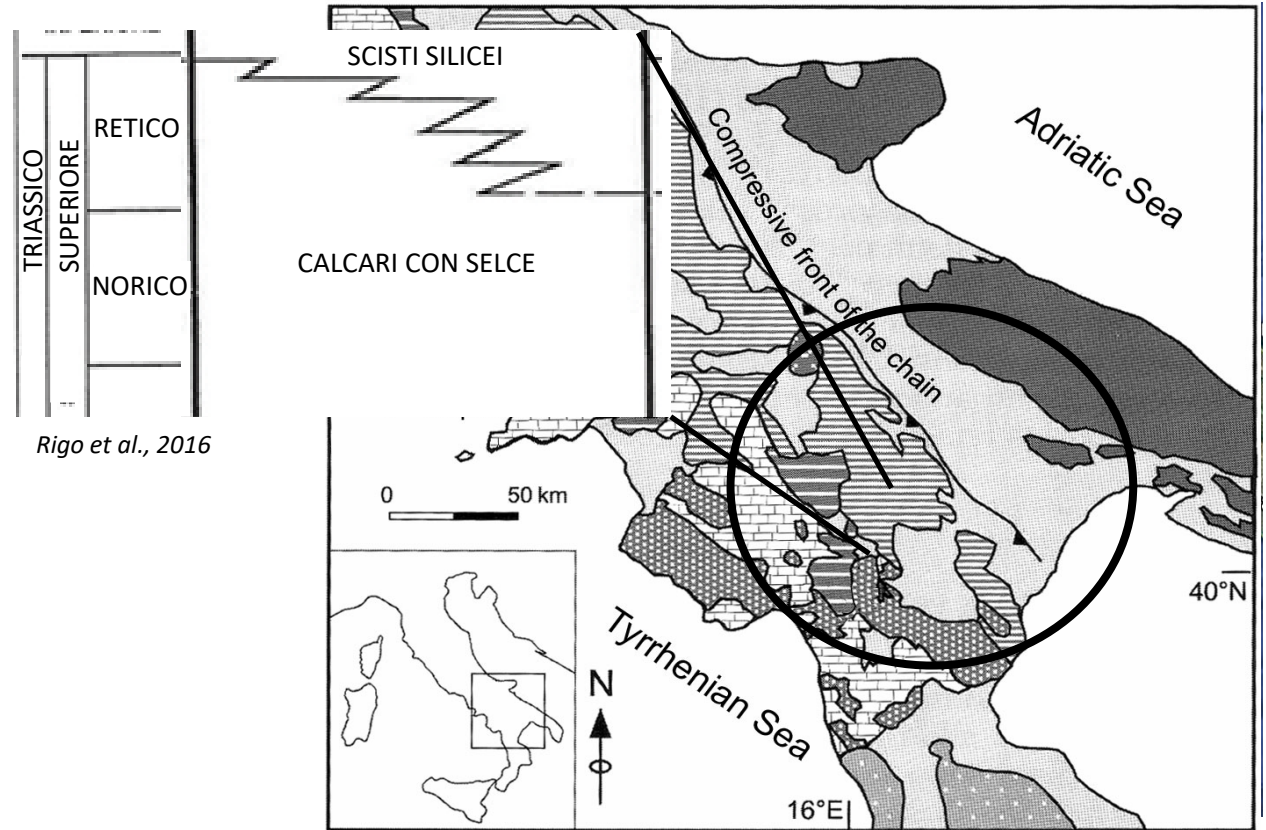
Triassico Superiore: ambiente  
marino pelagico profondo



# BACINO LAGONEGRO

## Formazioni:

- Calcare con Selce: è una lime mudstone con liste e noduli di selce
- Scisti Silicei: selci e radiolariti (ricche in radiolari)

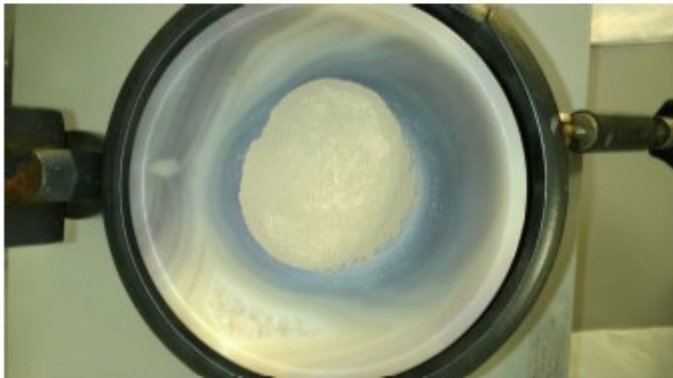
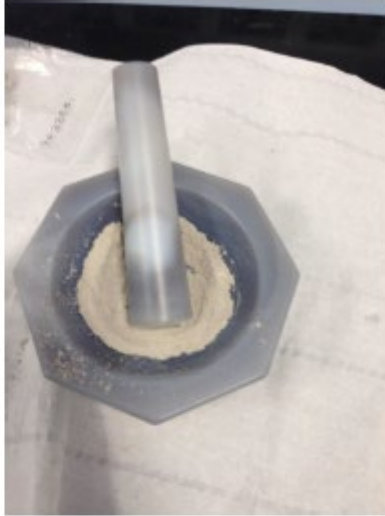


Rigo et al., 2016

Parotto & Praturlon, 2004



## CAMPIONAMENTO DATI



*Frantumazione con mortaio*



Spettrometro IRMS utilizzato per le analisi.  
Laboratori di ricerca UNIPD

## CALIBRAZIONE DATI

Calibrazione dati tramite utilizzo di standard:

- *Internazionali:*

CH6= -10.445 ‰ e CH7=-32.15 ‰

- *Interno:*

ZER: deviazione standard <0.2‰



*Esempio campione d'analizzare*

# SCELTA DATI DA UTILIZZARE

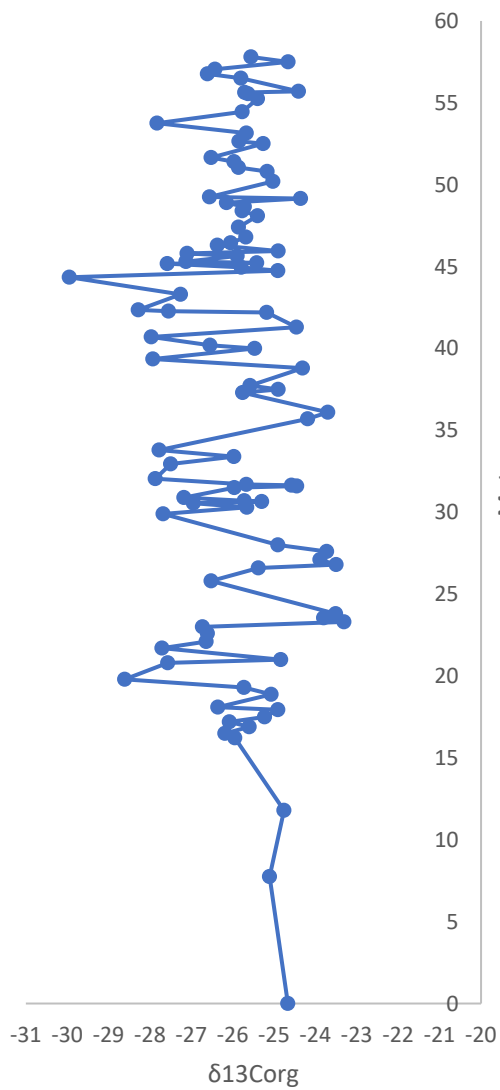
Pignola-Abriola      Mt.Volturino      Madonna del Sirino      Sasso di Castalda

Meter	$\delta^{13}C_{org}$ (‰)	Meter	$\delta^{13}C_{org}$ (‰)	Meter	$\delta^{13}C_{org}$ (‰)	Meter	$\delta^{13}C_{org}$ (‰)
57.8	-25.56	71	-19.88	77.5	-20.26	110.45	-25.88
57.5	-24.66	66	-21.89	76	-24.95	108.6	-24.62
57.05	-26.43	65	-25.15	72.25	-26.37	108.45	-24.73
56.76	-26.61	52	-28.05	67.5	-27.01	108.35	-24.68
56.5	-25.8	51	-27.78	67	-22.36	108.3	-23.90
55.7	-24.41	50.66	-27.36	66.2	-25.66	108.25	-24.34
55.63	-25.71	50.5	-26.33	65	-24.72	108.2	-24.38
55.55	-25.63	49.5	-26.56	64.7	-25.3	104.9	-25.38
55.25	-25.4	49	-27.52	64.5	-24.46	96.2	-24.97
54.45	-25.77	48.2	-25.23	63.8	-25.76	95.9	-24.68
53.75	-27.83	47.1	-27.46	63	-24.75	91.5	-26.13
53.15	-25.67	46.6	-26.5	62.5	-23.14	90.6	-25.32
52.65	-25.85	46.2	-25.42	62	-21.83	89.5	-26.60
52.50	-25.26	42.5	-23.47	61.5	-25.1	82	-25.73
51.65	-26.52	42.45	-27.35	58	-25.03	80.4	-25.04
51.4	-25.97	42	-20.67	55.75	-25.42	78.8	-25.77
51.05	-25.86	41.5	-24.29	54.5	-26.2	77.8	-25.31
50.80	-25.17	41.43	-24.25	53.75	-24.03	71.2	-25.53
50.2	-25.03	41	-26.13	52	-30.35	70.6	-25.31
49.25	-26.56	40.2	-26.12	50	-25.66	69.6	-24.65
49.15	-24.36	38.45	-24.73	49	-22.62	61.1	-25.44
48.90	-26.15	38	-24.67	47.5	-22.42	60.45	-25.26
48.65	-25.72	38	-26.07	47	-25.99	56.75	-24.59
48.4	-25.77	37.5	-23.15	46	-26.26	56.35	-25.68
48.1	-25.4	36.3	-24.3	42	-26.72	53.1	-25.12
47.4	-25.86	36	-24.52	39	-26.97	53.07	-25.18
46.80	-25.68	35.6	-24.35	33	-24.77		
46.45	-26.05	35	-24.86	31	-27.05		
46.3	-26.37	34	-23.65	29	-24.62		
45.95	-24.9	31	-25.6	28.5	-24.9		
45.80	-27.10	30.5	-24.83	27.5	-24.55		
45.65	-25.89	29	-26.29				
45.3	-27.13	28	-28.1				
45.23	-25.42	27	-25.48				
45.18	-27.58	24.5	-24.83				
44.95	-25.80	23	-23.13				
44.75	-24.91	22	-24.87				
44.35	-29.95	21	-22.47				
43.30	-27.26	18.5	-26.77				
42.35	-28.28	18	-24.77				
42.28	-27.55	16.5	-25.17				
42.2	-25.18	14	-26.14				
41.3	-24.46	13.5	-26.01				
40.7	-27.97	11	-27.4				
40.19	-26.55	9	-26.61				
40.00	-25.47	8	-24.6				
39.35	-27.93	7	-25.35				
38.80	-24.31	6	-26.11				
37.73	-25.58	4	-25.25				
37.50	-24.90	1	-26.31				

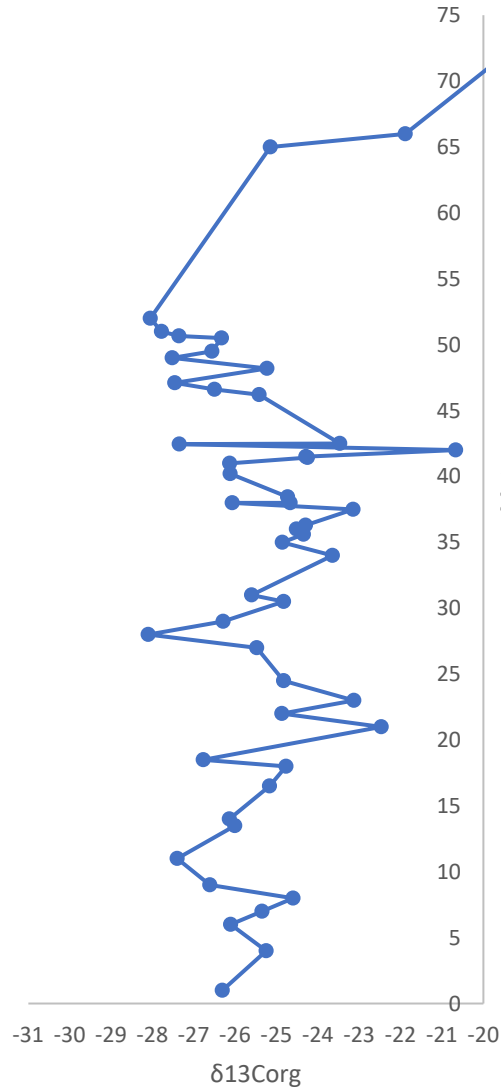
*Risultati analisi riportati in Excel*



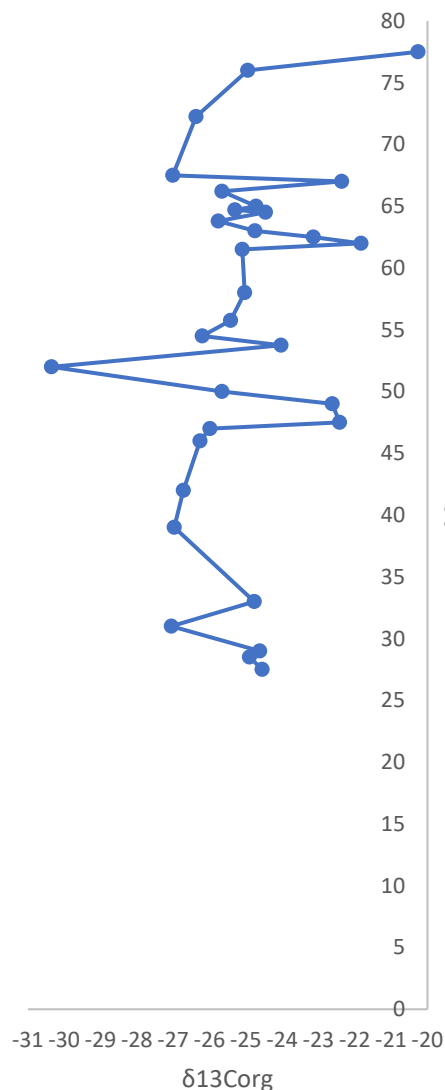
Pignola-Abriola, Italy



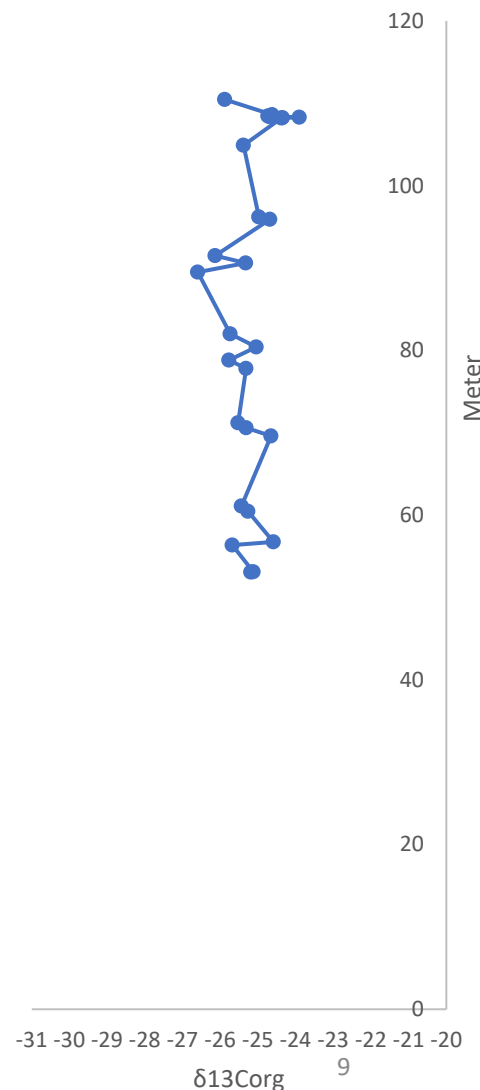
Monte Volturino



Madonna del Sirino



Sasso di Castalda

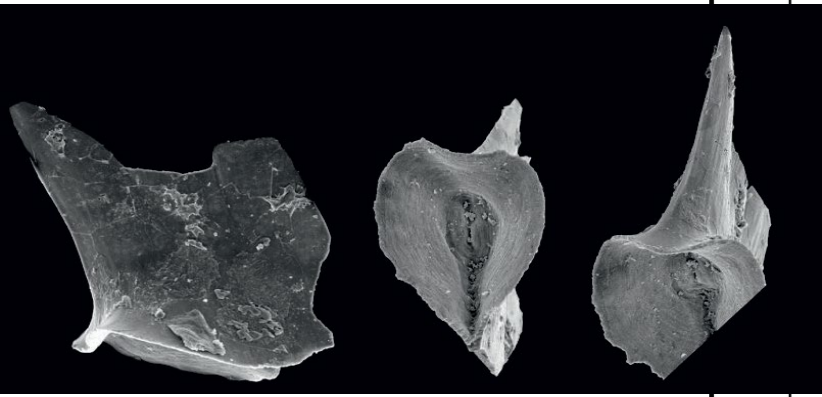


# SCelta DATI DA UTILIZZARE

		Tethys-Lagonegro	
Stages	Subst.	Conodont	Radiolarian
<b>Rhaetian</b>		Misikella ultima	Globolaxtorum tozeri
		Misikella posthernsteini	
<b>Norian</b>	Sevatian	M.hernsteini P.andrusovi	Proparvicingula moniliformis
		Mockina bidentata	

Giordano et al.2011

# SCelta DATI DA UTILIZZARE



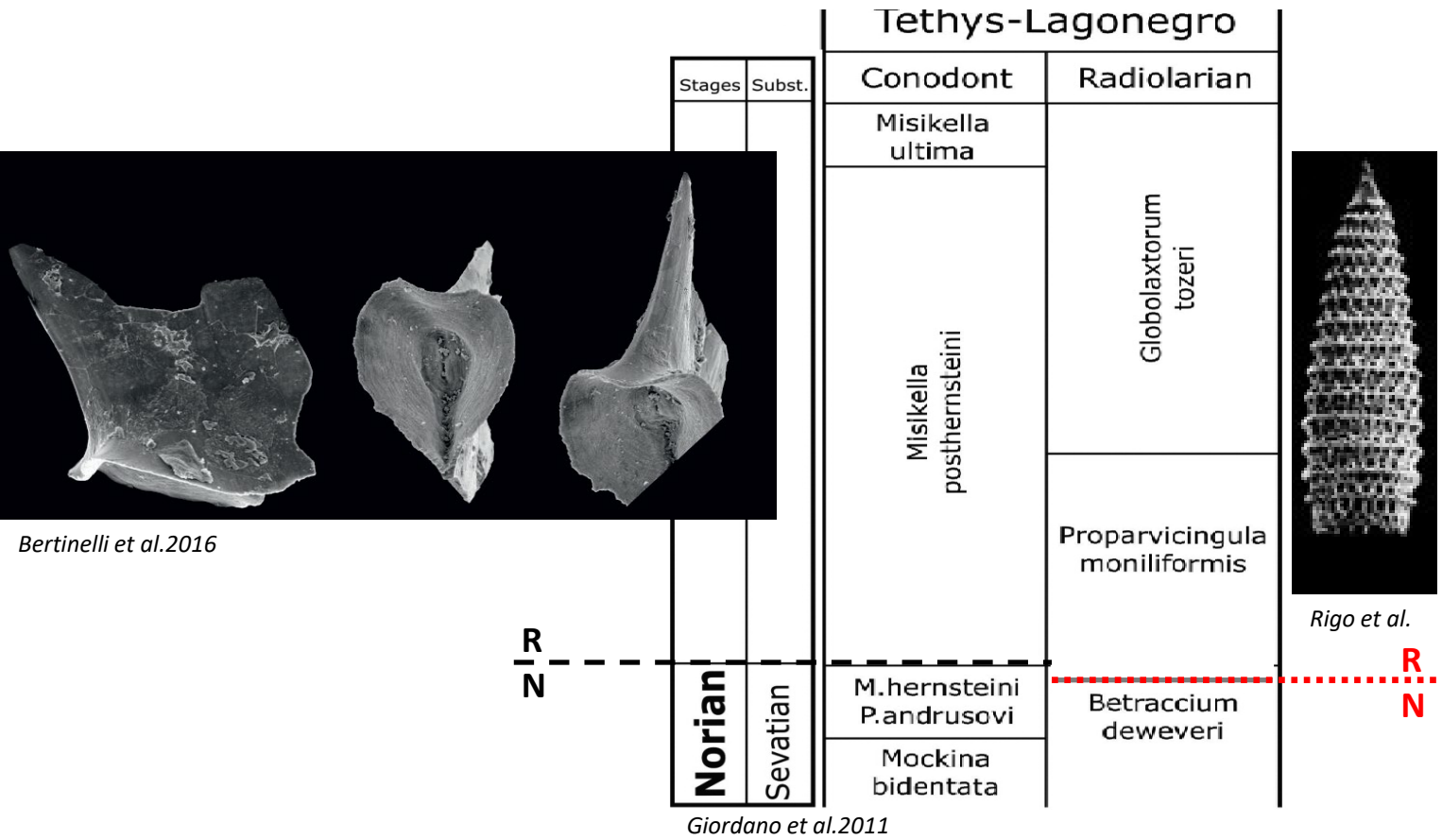
Bertinelli et al.2016

R  
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N

		Tethys-Lagonegro	
Stages	Subst.	Conodont	Radiolarian
		Misikella ultima	Globolaxtorum tozeri
		Misikella posthernsteini	
		M.hernsteini P.andrusovi	Proparvicingula moniliformis
		Mockina bidentata	Betraccium deweveri
	<b>Norian</b>		
	Sevastian		

Giordano et al.2011

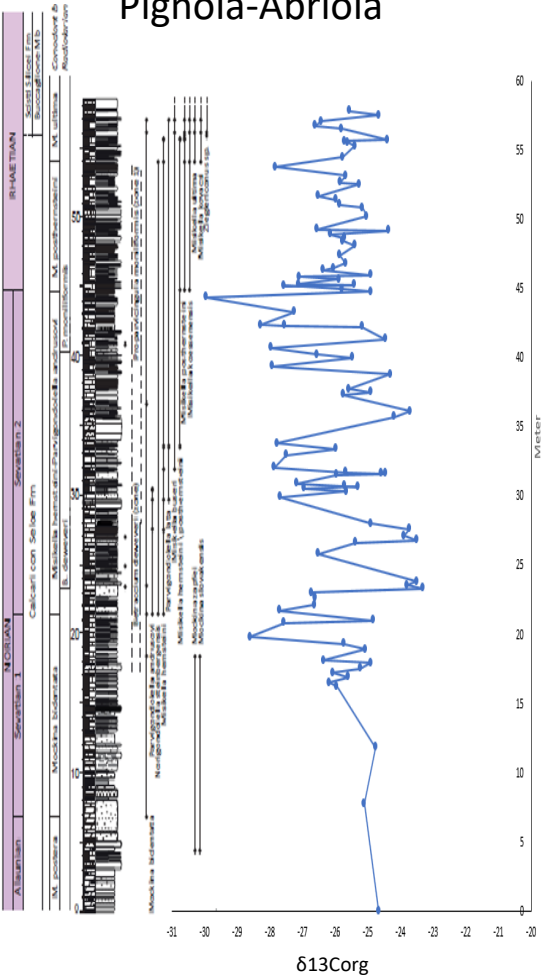
# SCelta DATI DA UTILIZZARE



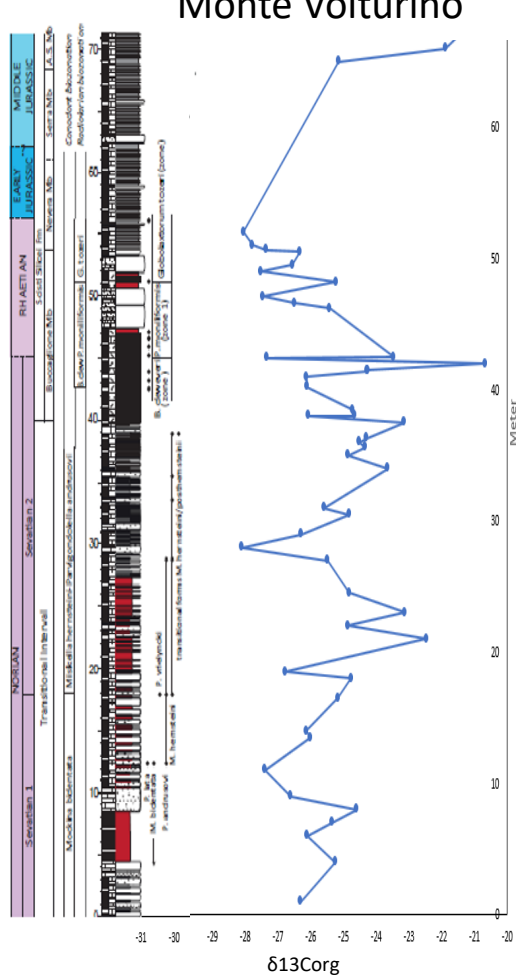
# CORRELAZIONI BIOCHIOSTRATIGRAFICHE

120

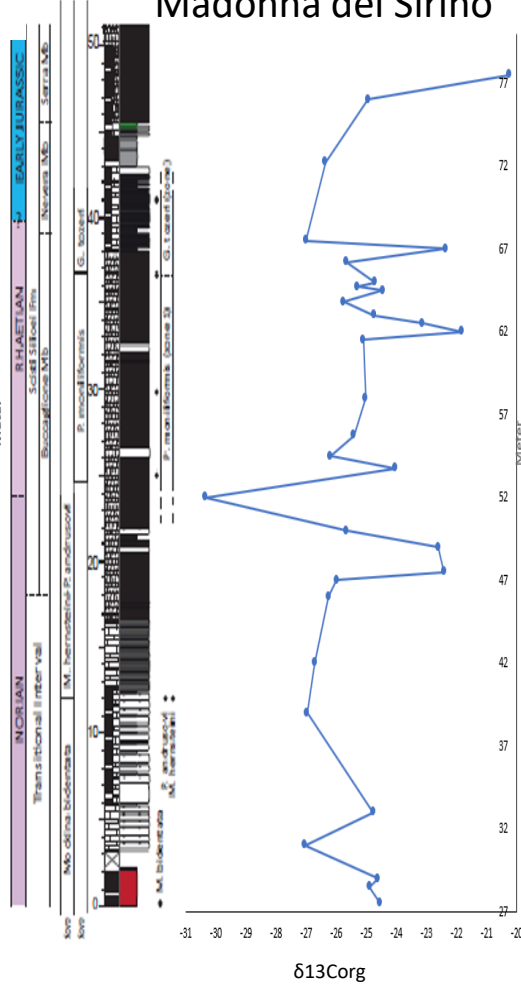
## Pignola-Abriola



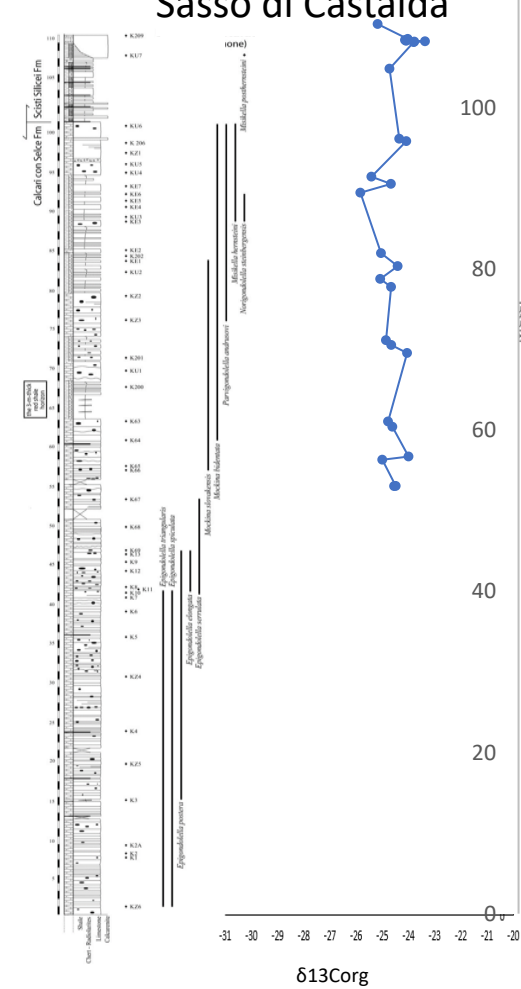
## Monte Volturino



## Madonna del Sirino

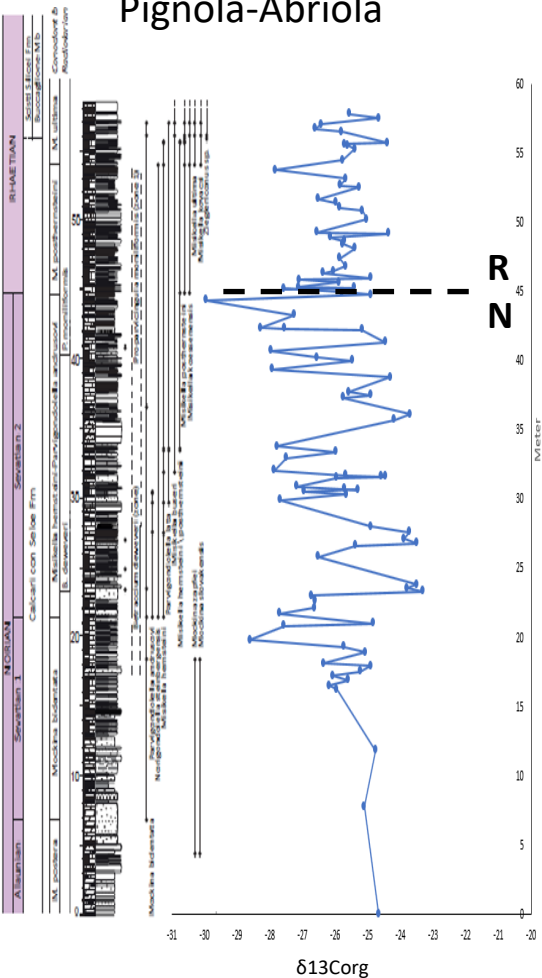


## Sasso di Castalda

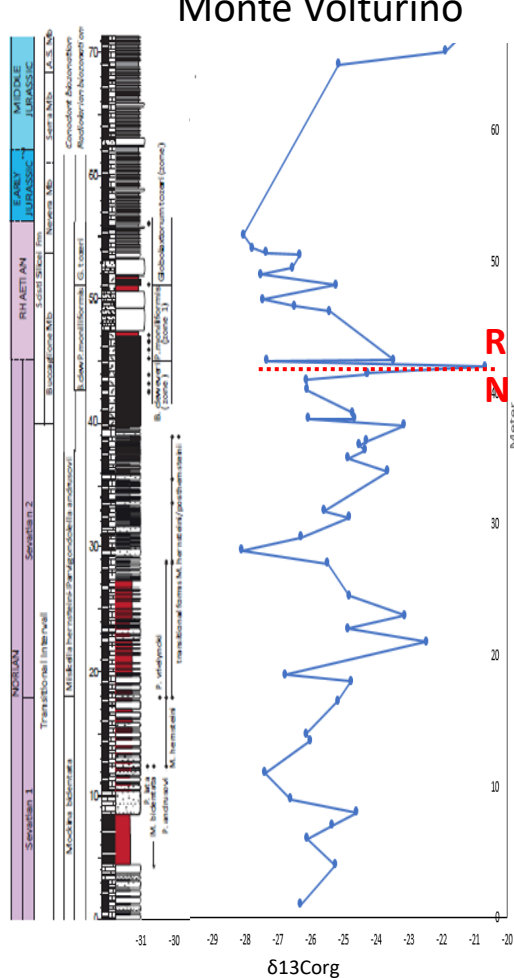


# LIMITE N/R SU CONSIDERAZIONI BIOSTRATIGRAFICHE

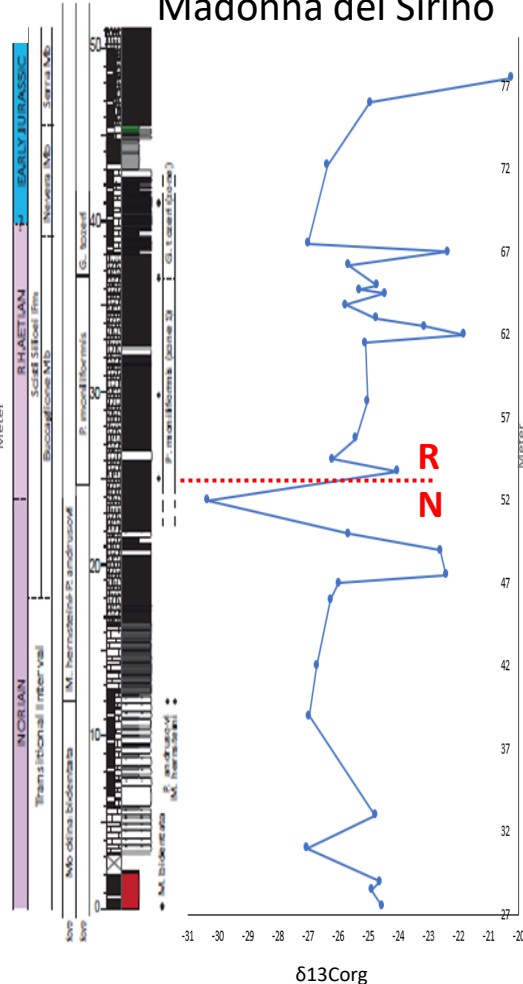
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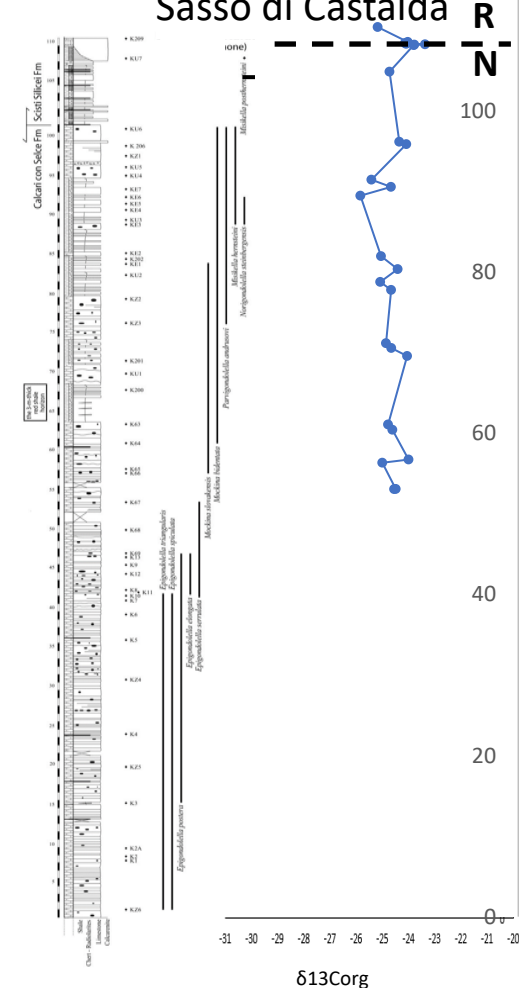
## Monte Volturino



## Madonna del Sirino



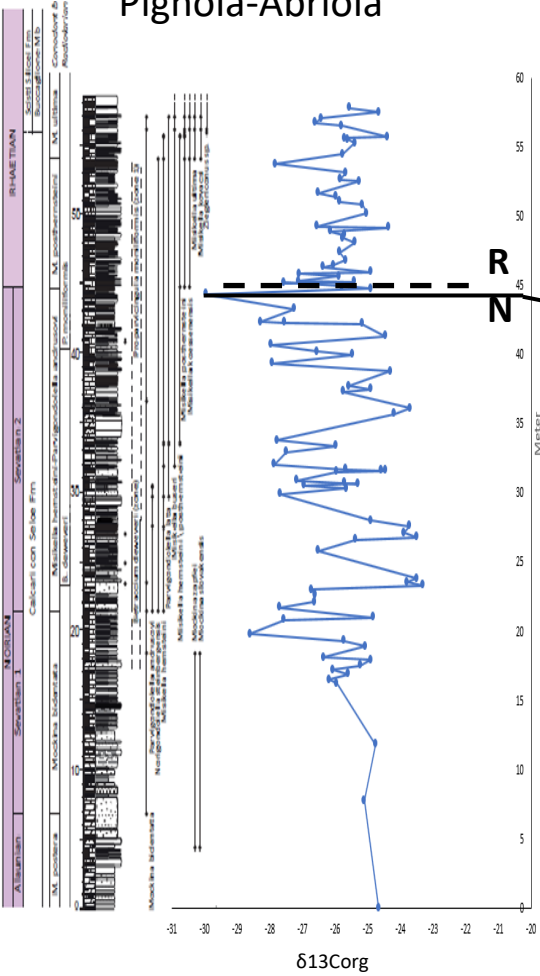
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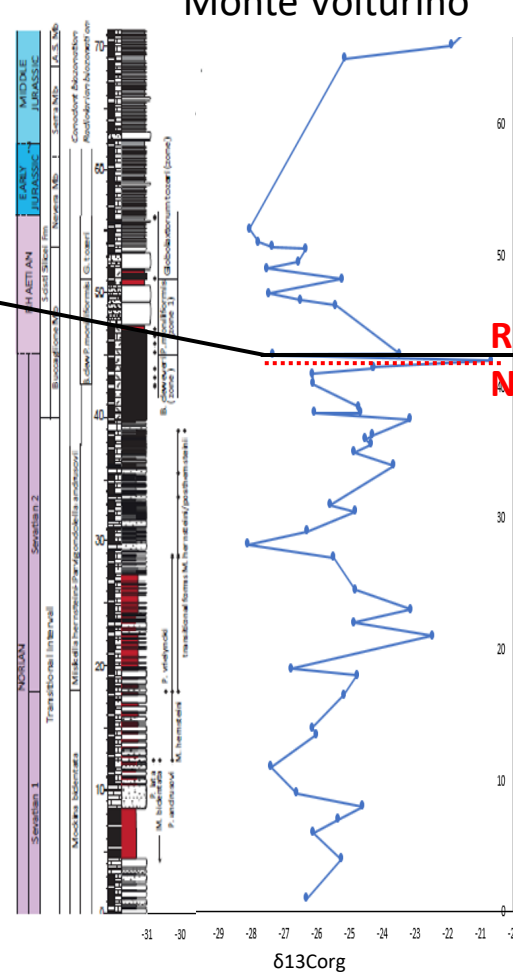


# SHIFT NEGATIVO INTORNO AL LIMITE N/R

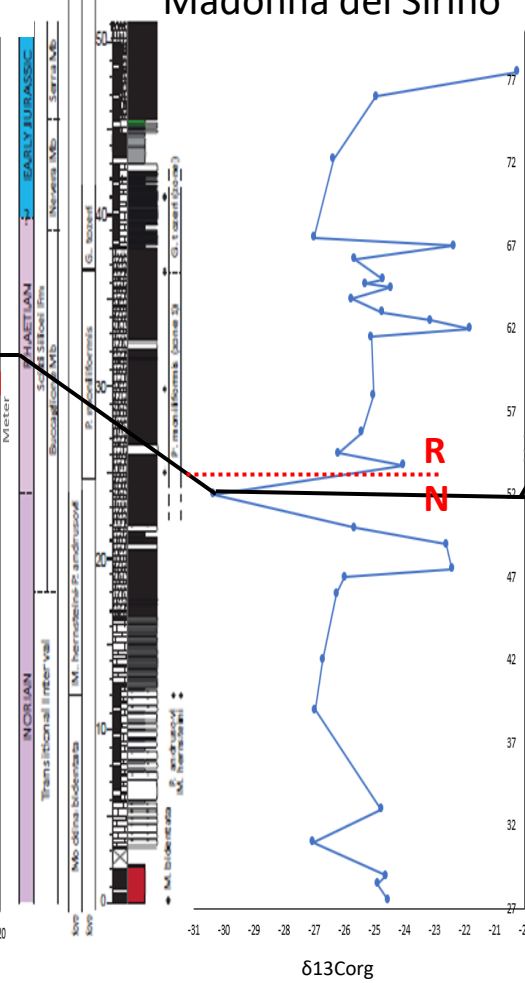
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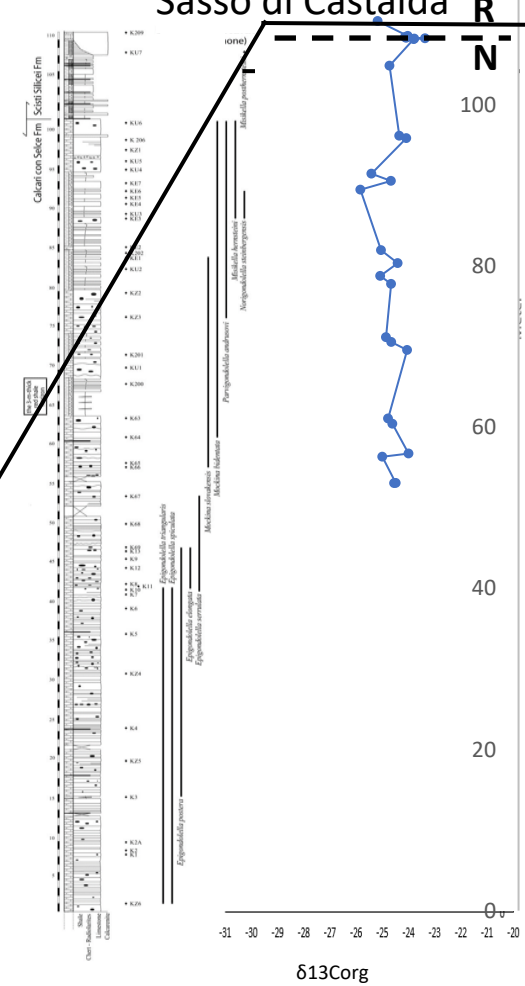
## Monte Volturino



## Madonna del Sirino

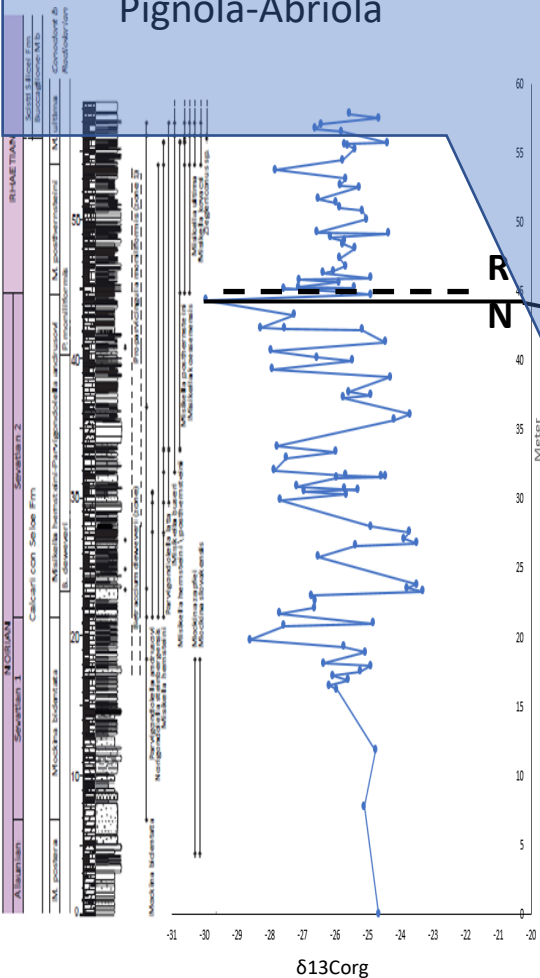


## Sasso di Castalda

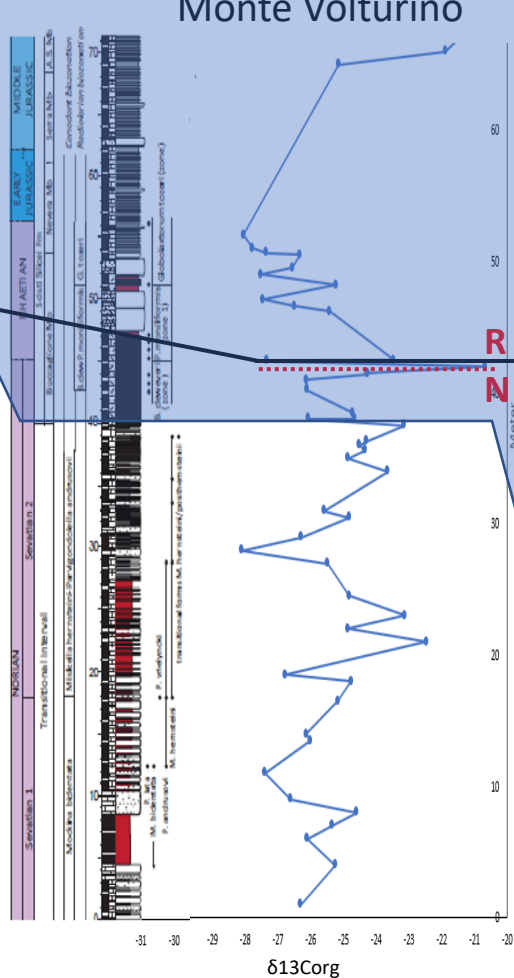


# LIMITE N/R VS. LITOLOGIA

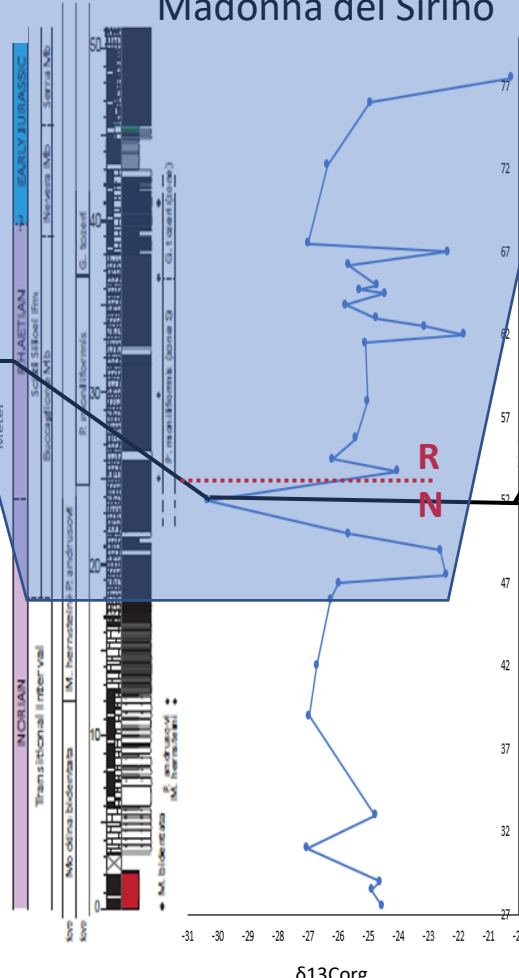
## Pignola-Abriola



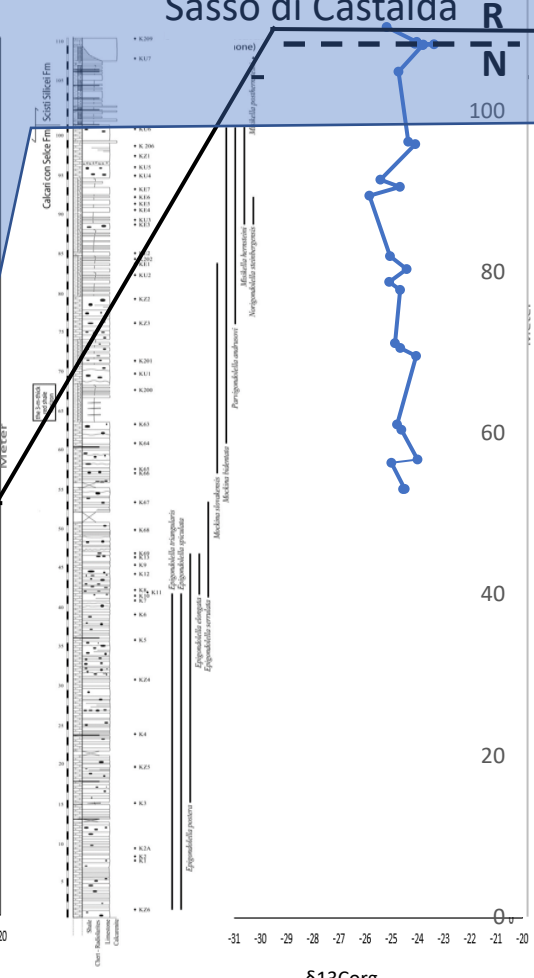
## Monte Volturino



## Madonna del Sirino



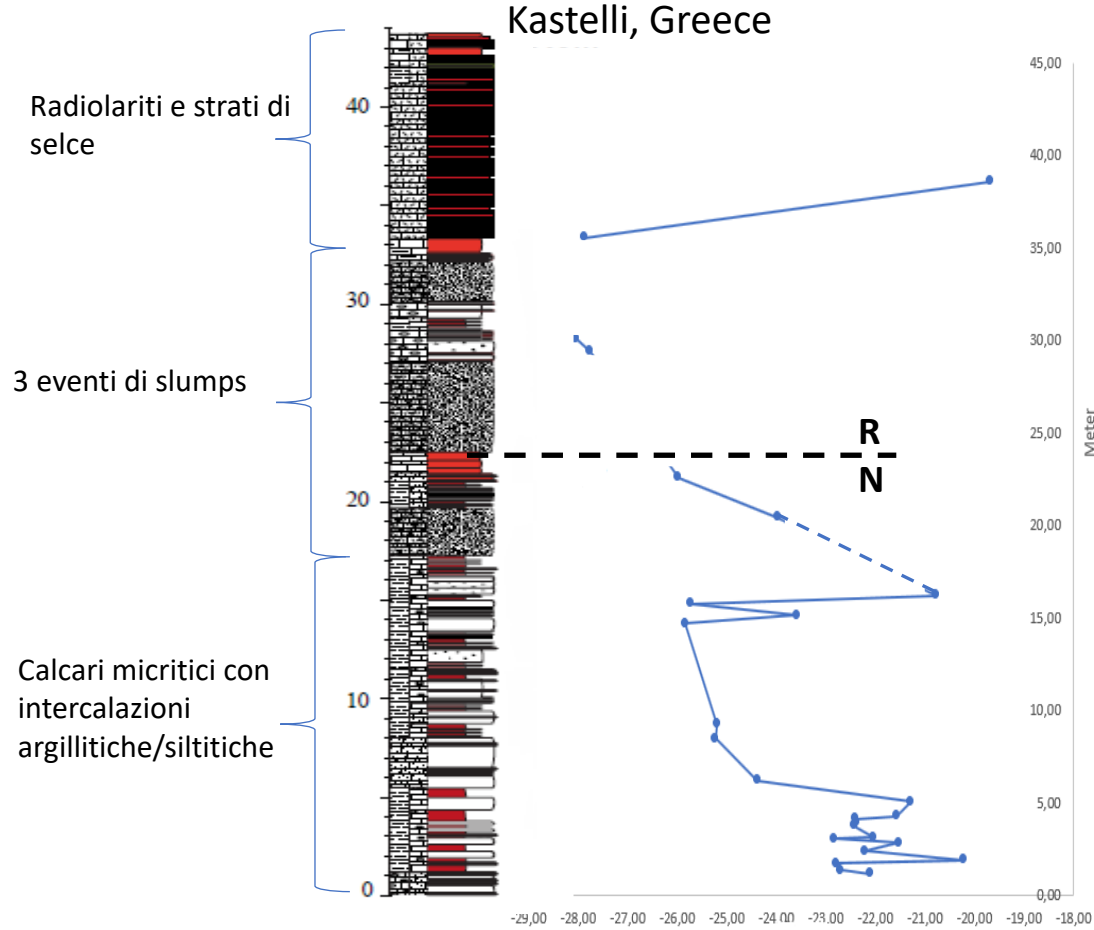
## Sasso di Castalda



Calcarei con selce
  Scisti silicei

# CORRELAZIONI ESTERNE AL BACINO

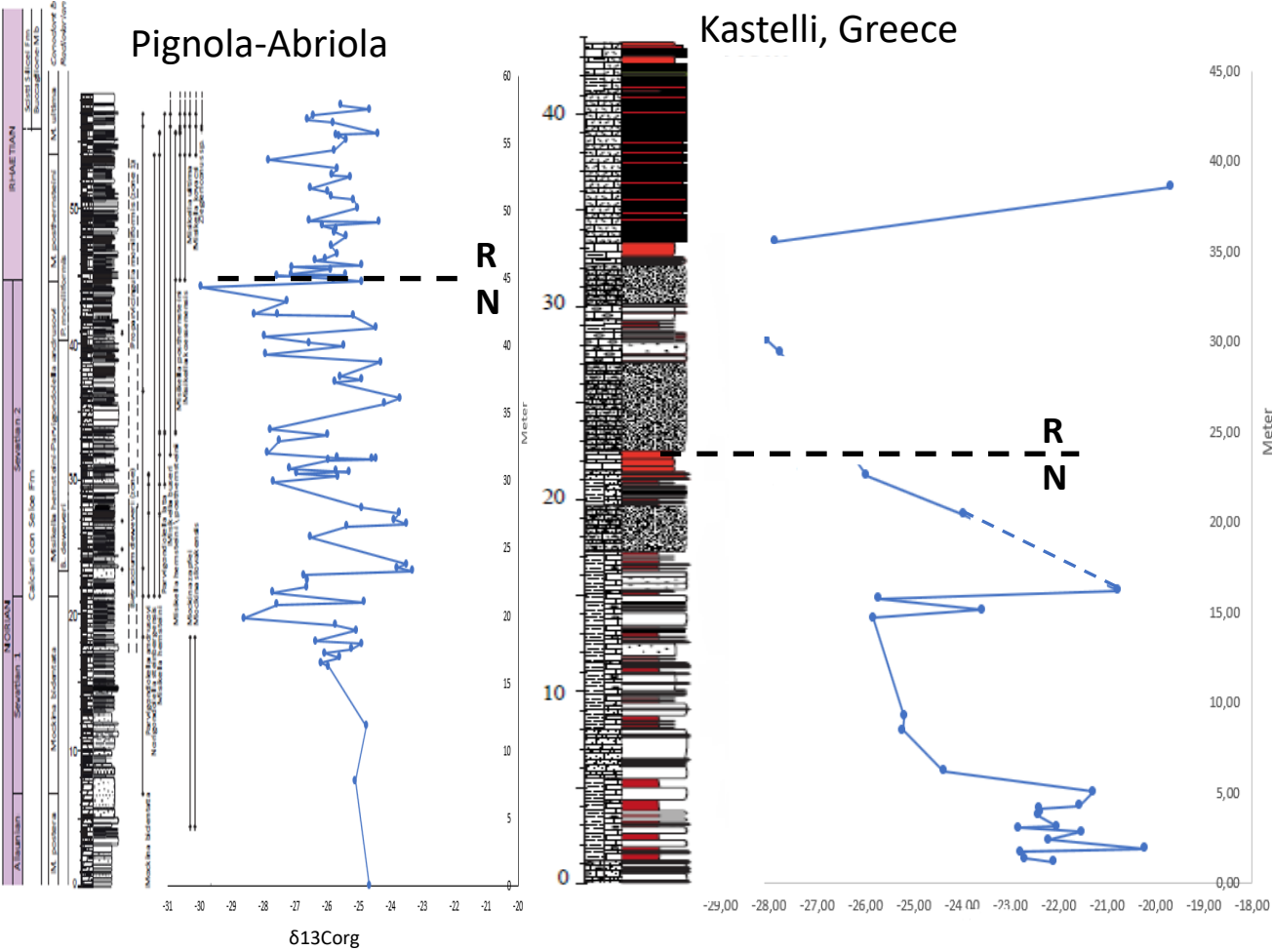
Bacino di Pindos  
**FORMAZIONE DI DRIMOS**



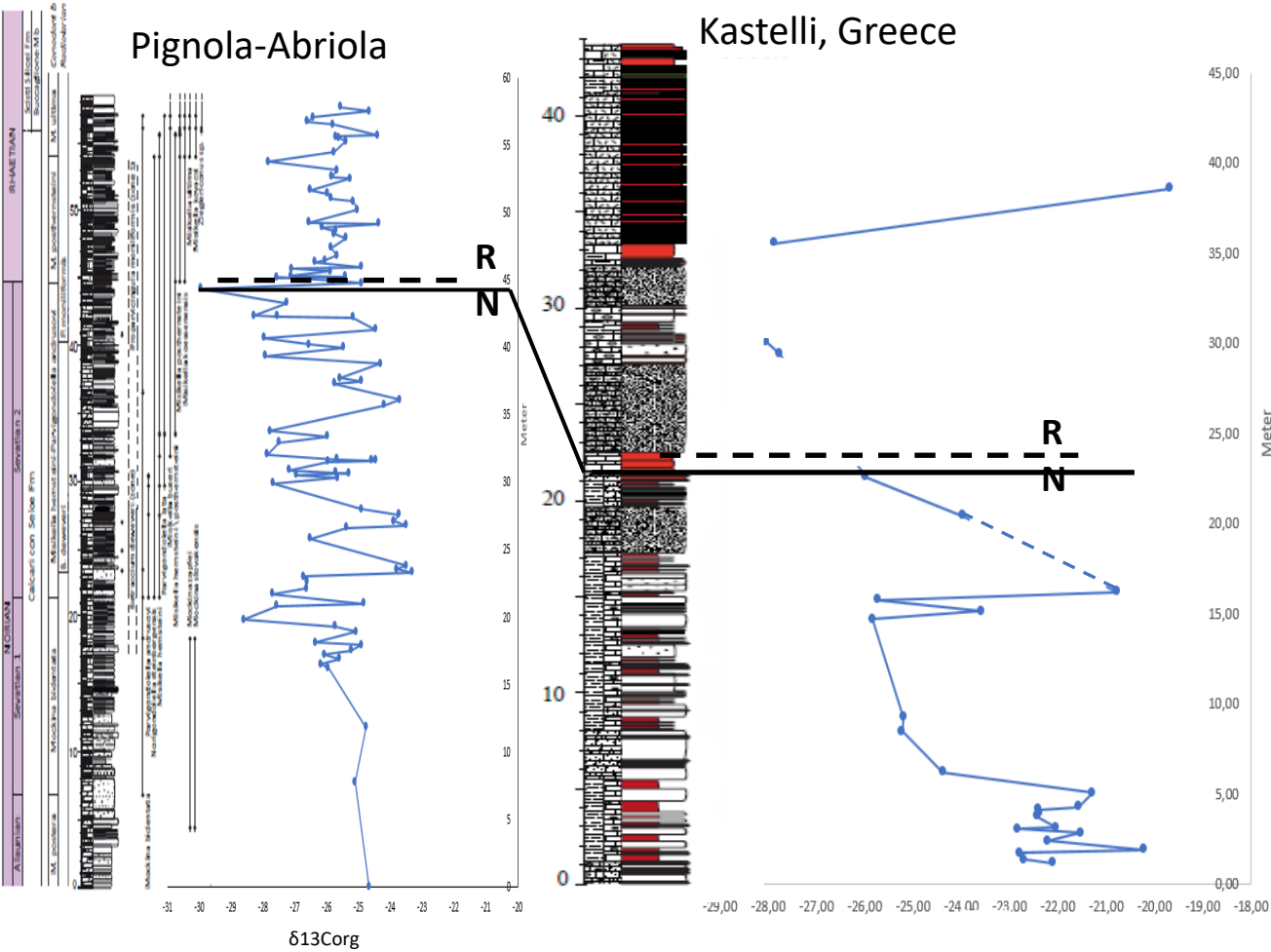
Kastelli, Greece

Meter	$\delta^{13}C_{org}$ (‰)
38.60	-19.68
35.56	-27.88
30.10	-28.04
29.40	-27.76
22.58	-25.98
20.45	-23.97
16.21	-20.77
15.77	-25.72
15.13	-23.58
14.68	-25.83
9.25	-25.19
8.48	-25.23
6.22	-24.38
5.05	-21.28
4.30	-21.57
4.12	-22.41
3.93	-22.37
3.77	-22.42
3.15	-22.04
3.05	-22.83
2.83	-21.53
2.39	-22.20
1.90	-20.21
1.73	-22.78
1.37	-22.69
1.18	-22.09

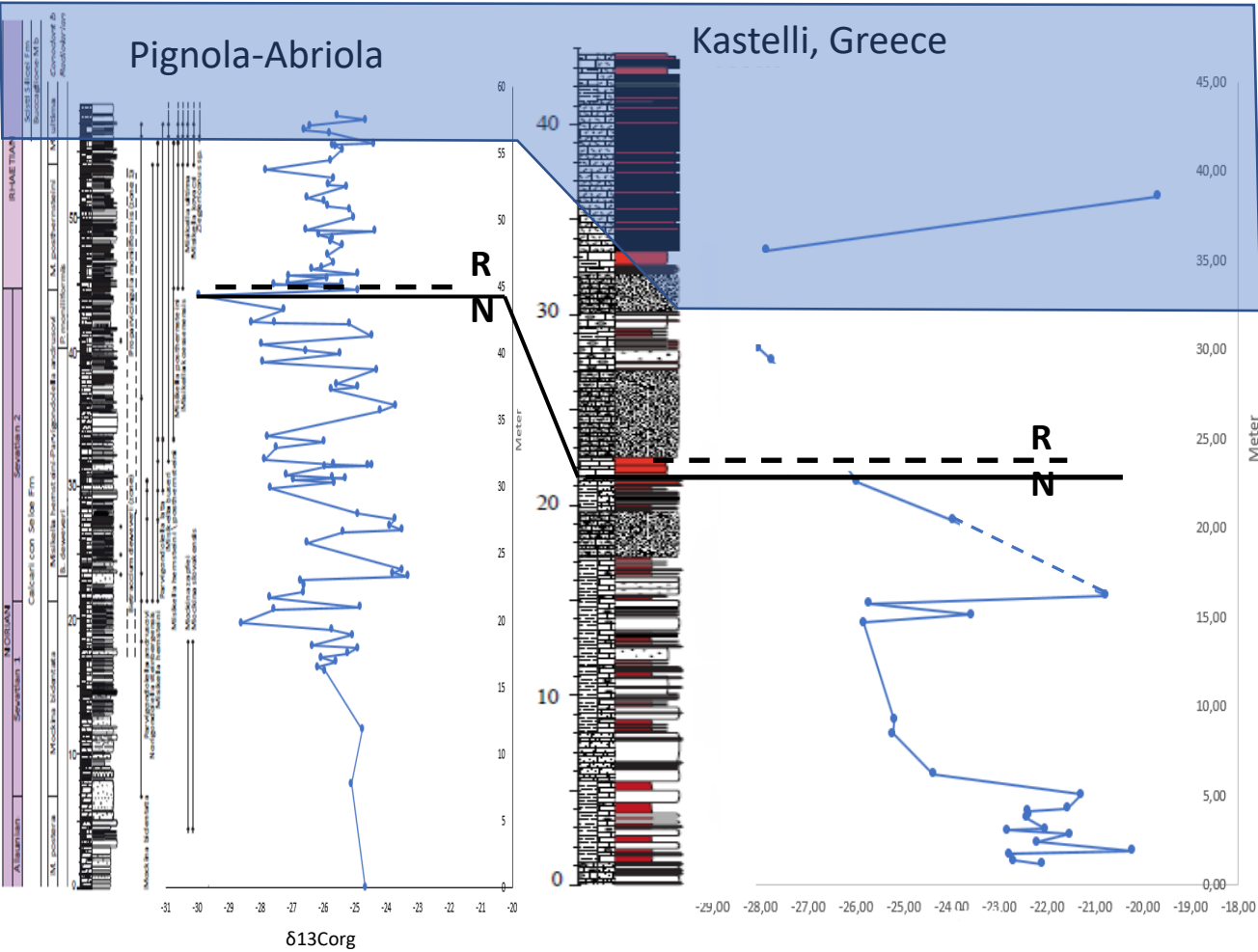
# CORRELAZIONI ESTERNE AL BACINO



# CORRELAZIONI ESTERNE AL BACINO



# CORRELAZIONI ESTERNE AL BACINO

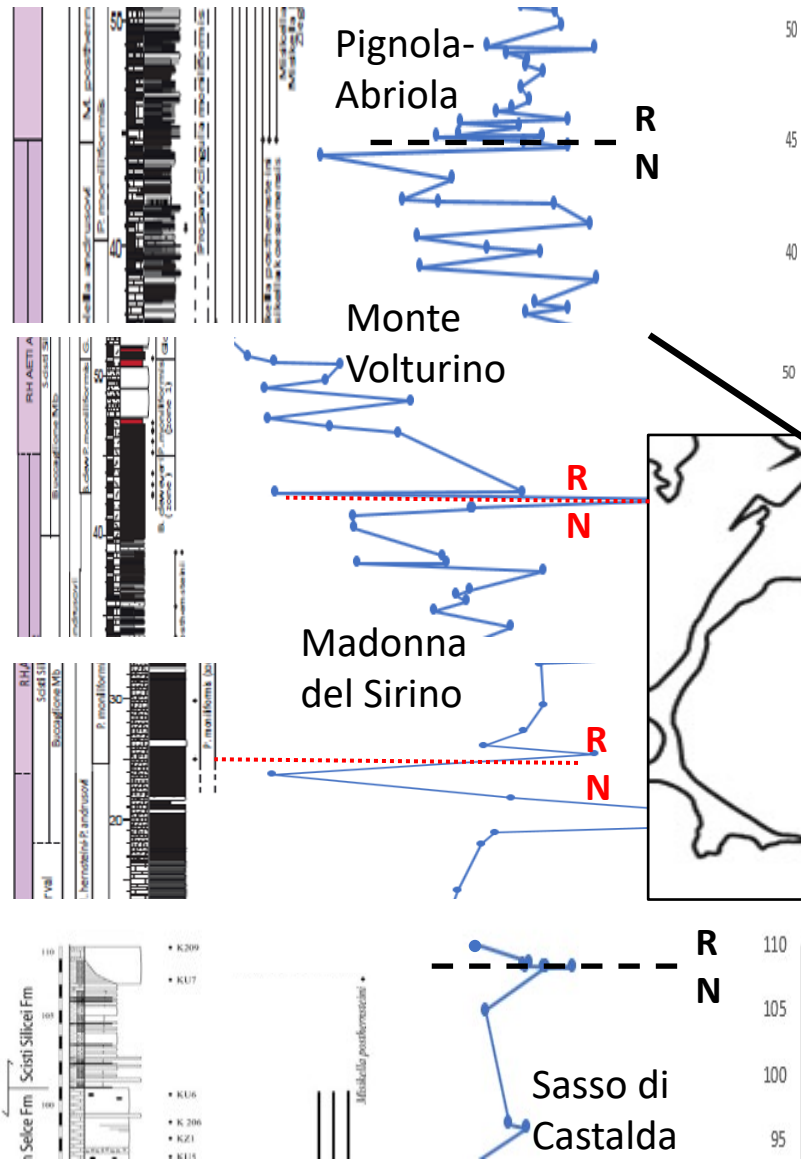


□ Sopra  
CCD

■ Sotto  
CCD



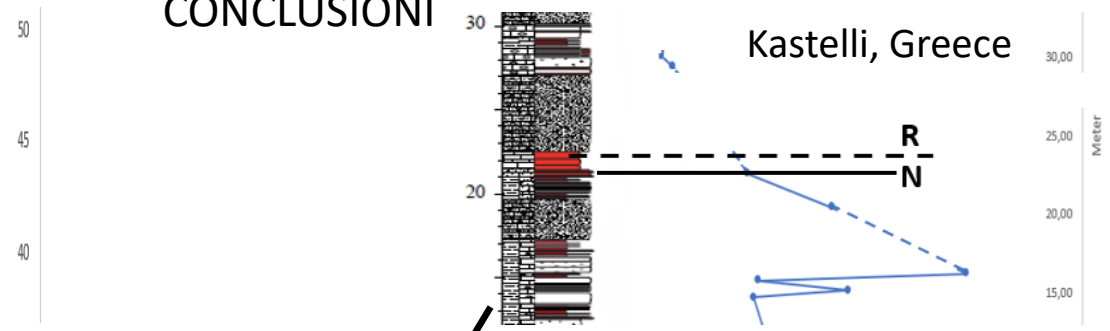
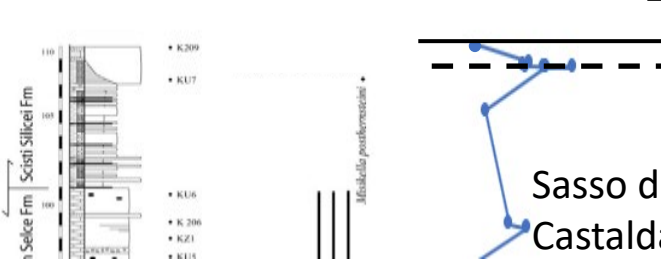
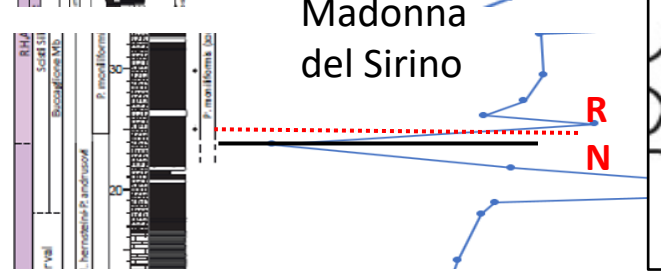
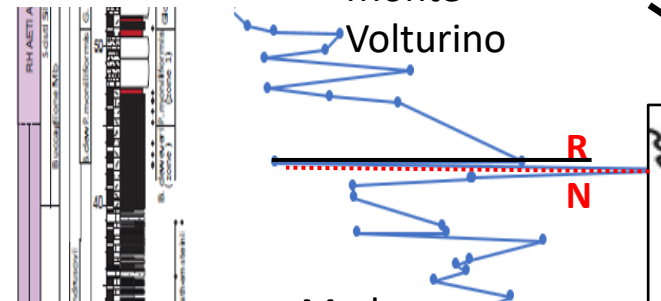
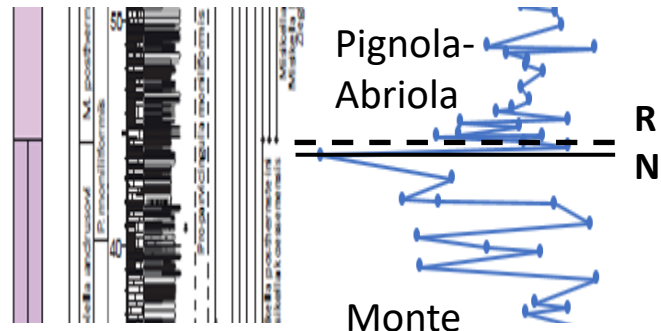
# CONCLUSIONI



Il limite N/R può essere tracciato in corrispondenza della FO della specie *Misikella posthernsteini*

Rigo et al.2020

# CONCLUSIONI



Rigo et al.2020

Evidenze nella Tetide Occidentale (Bacino di Lagonegro e di Pindos) della presenza di uno shift negativo attorno al limite N/R

## BIBLIOGRAFIA

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- *Giordano et al., 2011, The Norian-Rhaetian interval in two sections of the Lagonegro area: the transition from carbonate to siliceous deposition.*
- *Reggiani et al., 2005, Triassic-Jurassic stratigraphy of the Madonna del Sirino succession (Lagonegro Basin, Southern Apennines, Italy).*
- *Rigo et al., 2012, Stratigraphy of the Carnian-Norian Calcari con selce formation in the Lagonegro Basin, southern Apennines.*
- *Kafousia et al., 2011, A global event with a regional character: the Early Toarcian Oceanic Anoxic Event in the Pindos Ocean (northern Peloponnese, Greece).*
- *Degan & Robertson, 1998, Mesozoic-early Tertiary passive margin evolution of the Pindos ocean (NW Peloponnese, Greece).*
- *Rigo et al., 2015, The Pignola-Abriola section (southern Apennines, Italy): a new GSSP candidate for the base of the Rethian stage.*

**GRAZIE PER L'ATTENZIONE**