

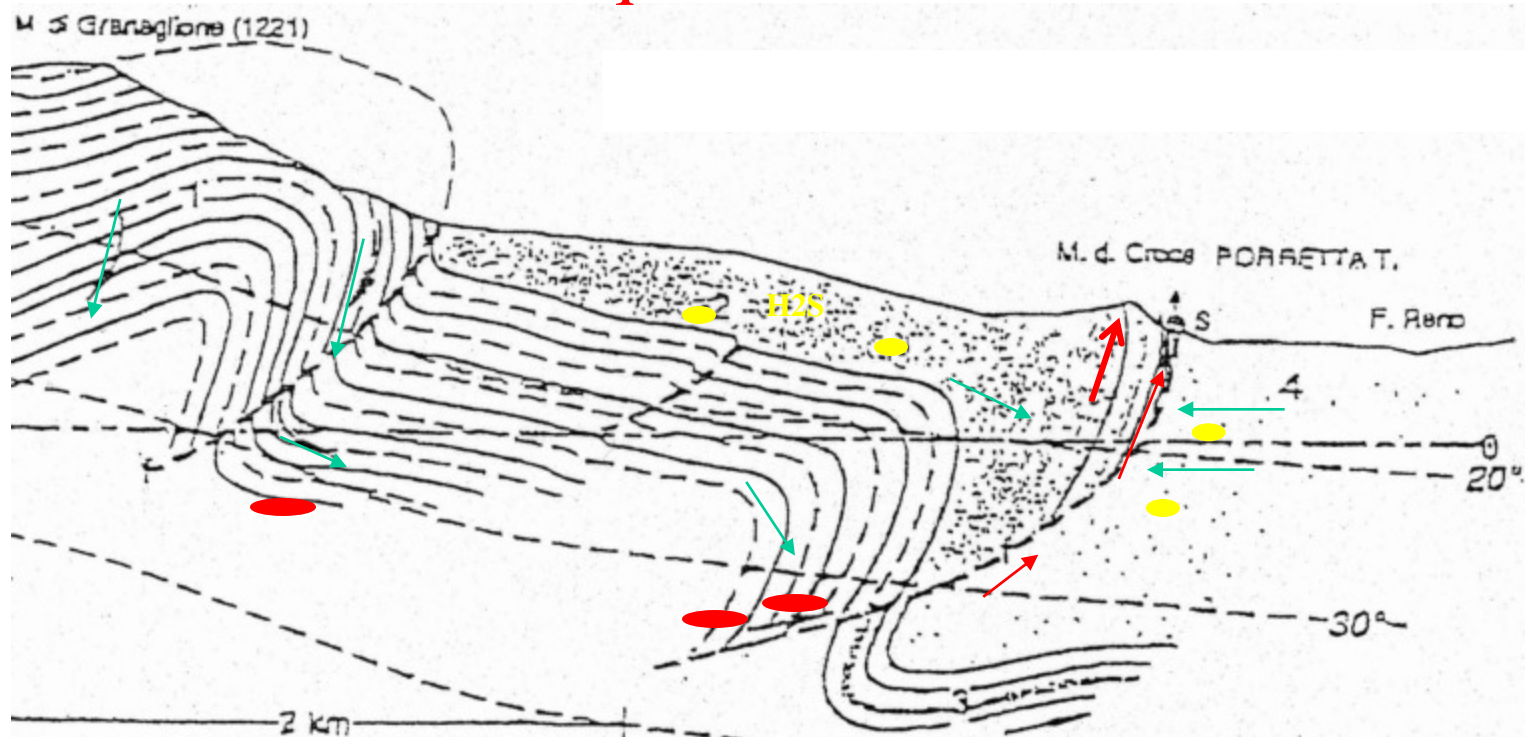
Idrogeologia termale porrettana

Nicola Ciancabilla
ARPAE EMILIA ROMAGNA

1979 : Idrogeologia di un bacino termale “le acque di Porretta Terme:
di *E.Amadesi, G.Brighenti, F.Ciancabilla, A.Gondoni, D.Vitali.*

1995 : Le acque minerali di Porretta Terme: di *A.Bonoli F.Ciancabilla C.Elmi.*

Acque fossili >CL > CH₄ So₄ = 0



Anno accademico 1998/99 : Tesi di laurea di *Morselli Barbara*: Considerazioni sull'origine e sull'evoluzione del bacino idrotermale di Porretta:

Relatore Fulvio Ciancabilla, Correlatori Landuzzi Alberto e Rossella Capozzi.

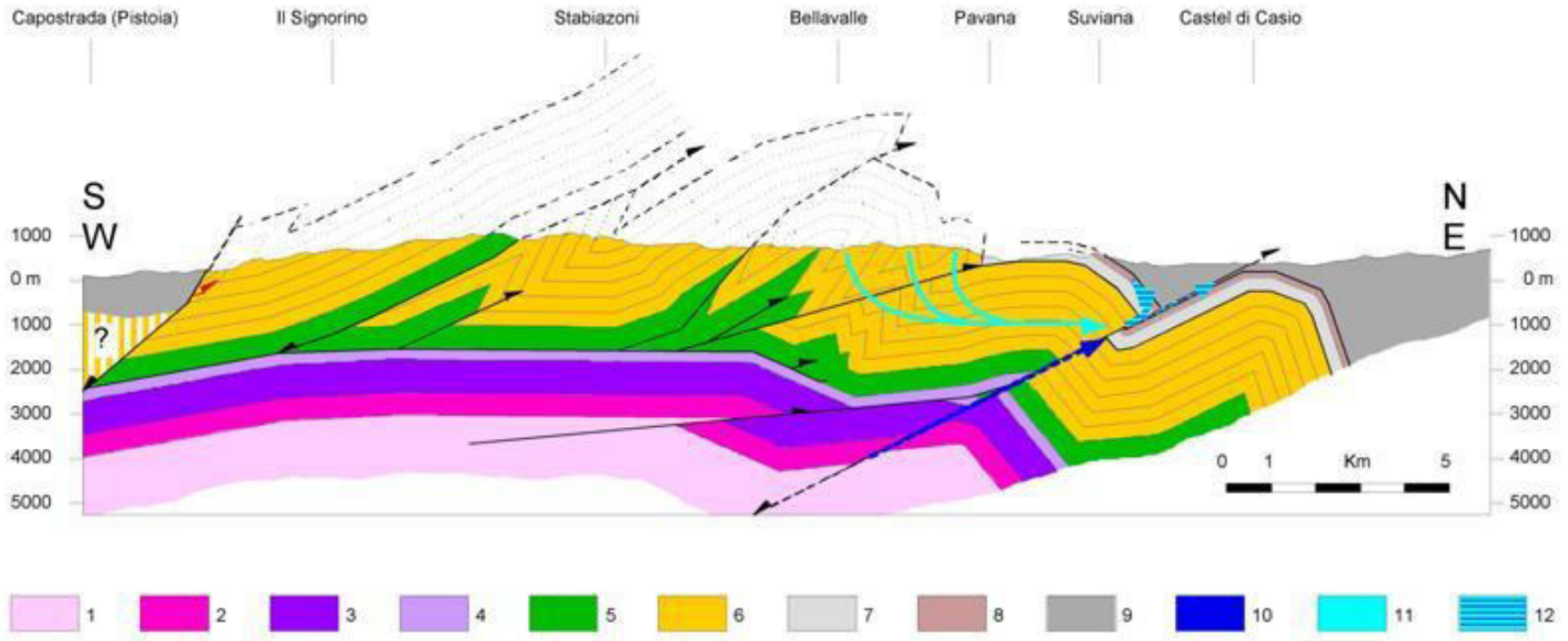


Table II. Analytical results for dissolved and bubbling gases. Dissolved gas data in cc/STP per litre; bubbling gas data in vol% for O₂, N₂, CH₄ and CO₂, in ppm for He and H₂.

Dissolved gas sample	Date	He	H ₂	O ₂	N ₂	CO	CH ₄	CO ₂	R/Ra	He/Ne
Puzzola1	02/03/2005	<	<	0.05	1.7	8.68E-05	3.52E+01	10.7	n.a.	n.a.
Bove	02/03/2005	<	<	0.07	1.2	1.53E-04	4.94E+01	29.6	n.a.	n.a.
Porretta Nuova	02/03/2005	<	2.0E-03	0.05	2.1	3.74E-05	3.15E+01	6.2	n.a.	n.a.
Sale	02/03/2005	<	<	0.04	2.4	7.49E-05	2.80E+01	22.9	n.a.	n.a.
Bubbling gas sample	Date	He	H ₂	O ₂	N ₂	CO	CH ₄	CO ₂	R/Ra	He/Ne
Porretta Nuova	02/03/2005	25	<	<	11.1	<	88.0	0.9	0.04	8.28
Sale	02/03/2005	<	605	<	1.2	<	94.5	4.2	n.a.	n.a.

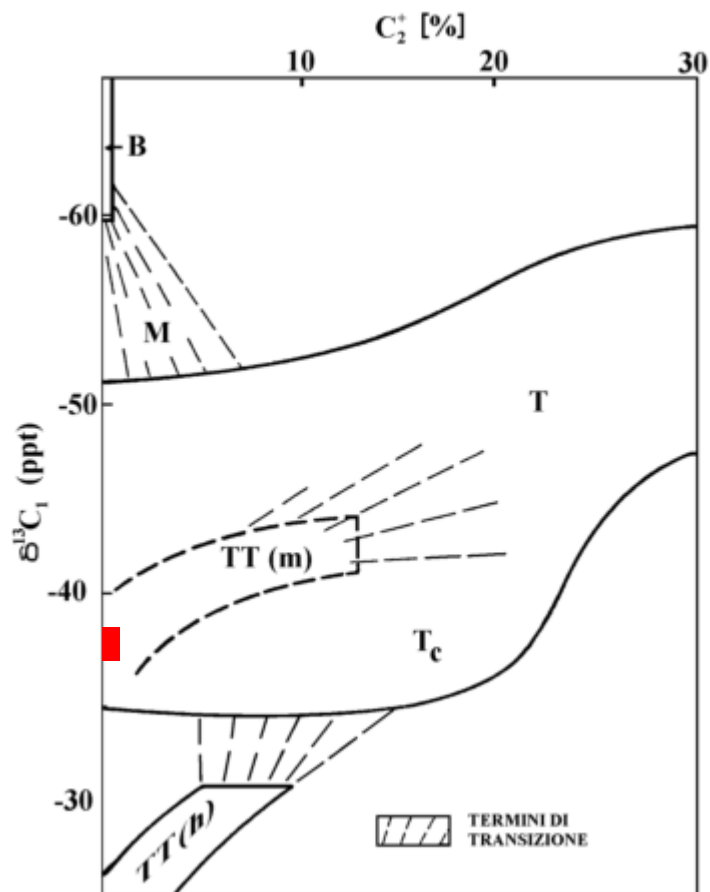
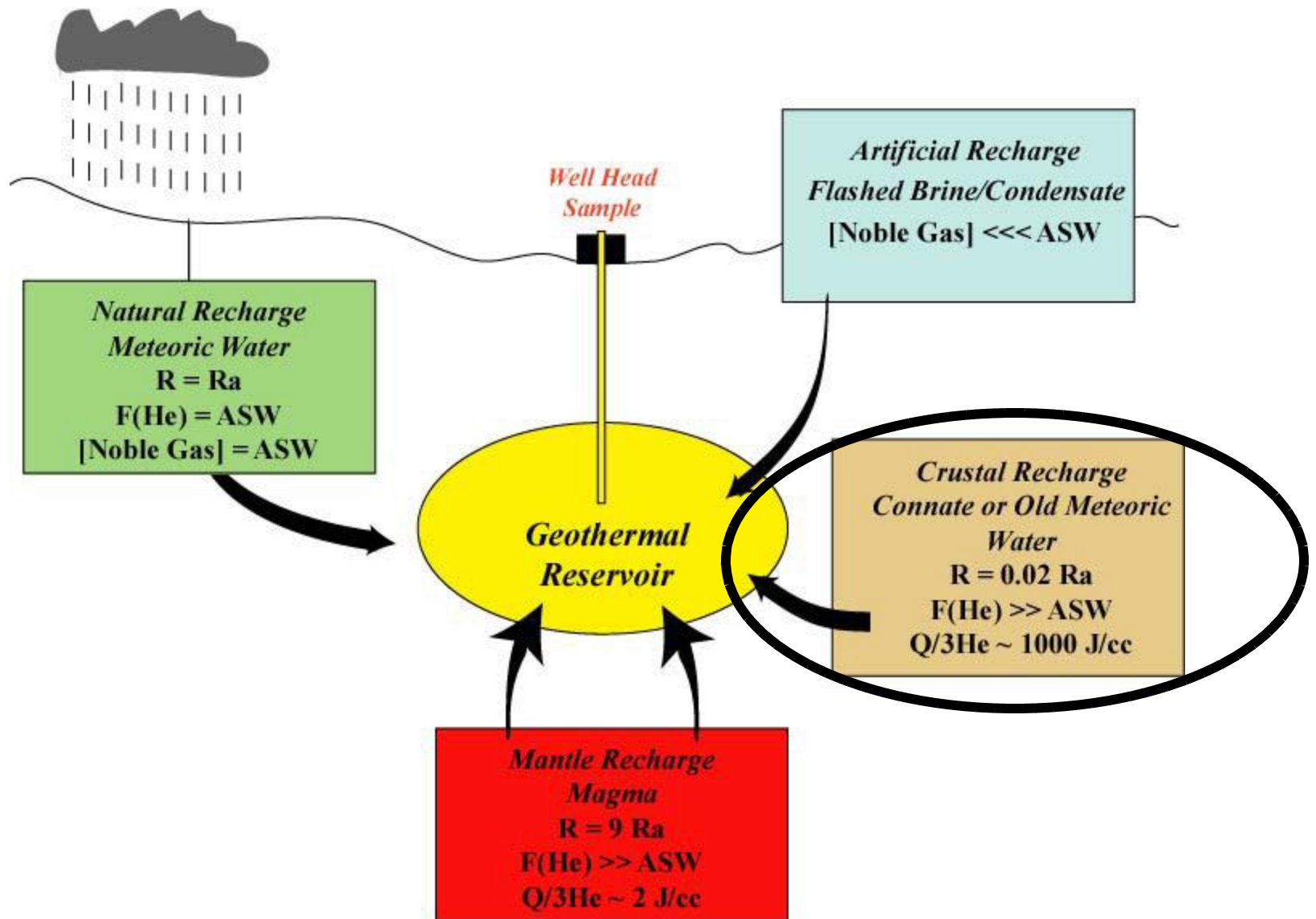
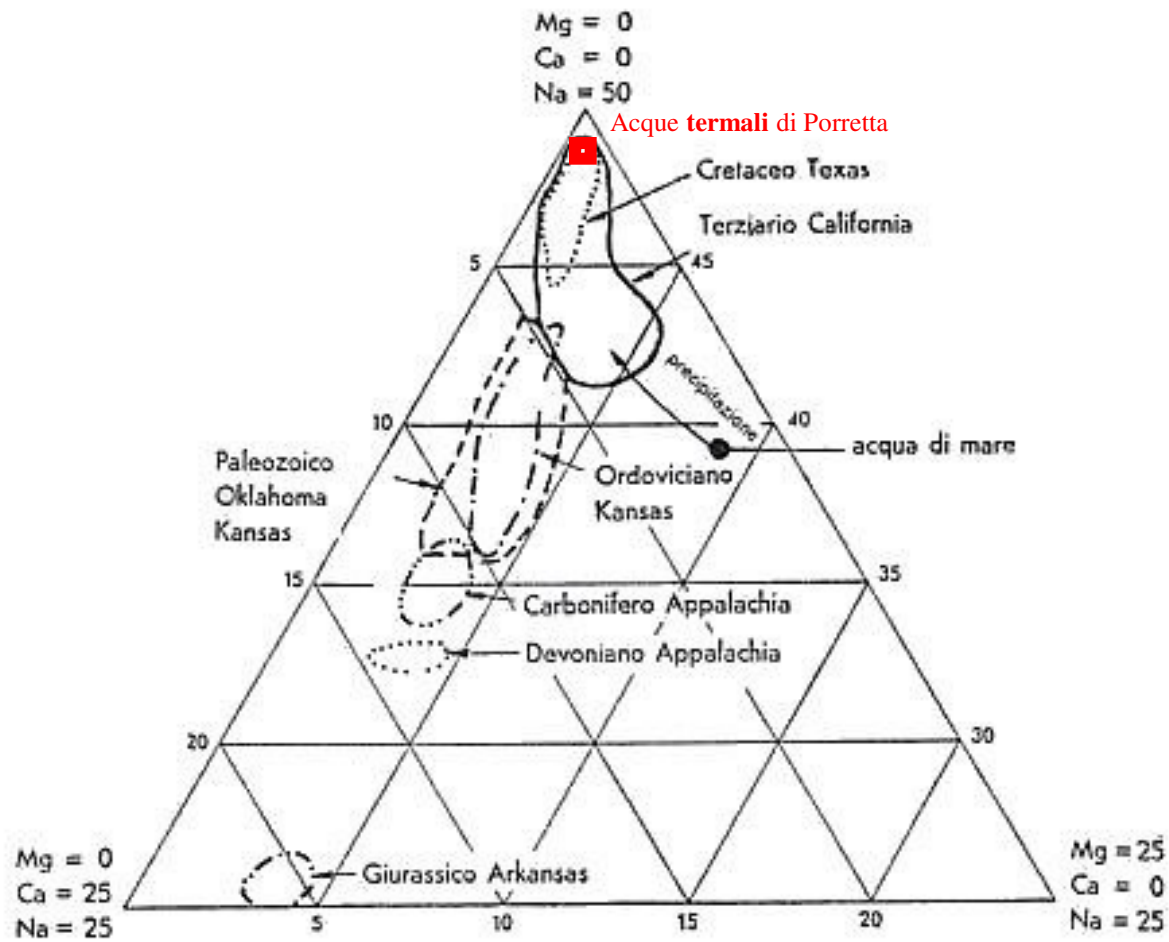
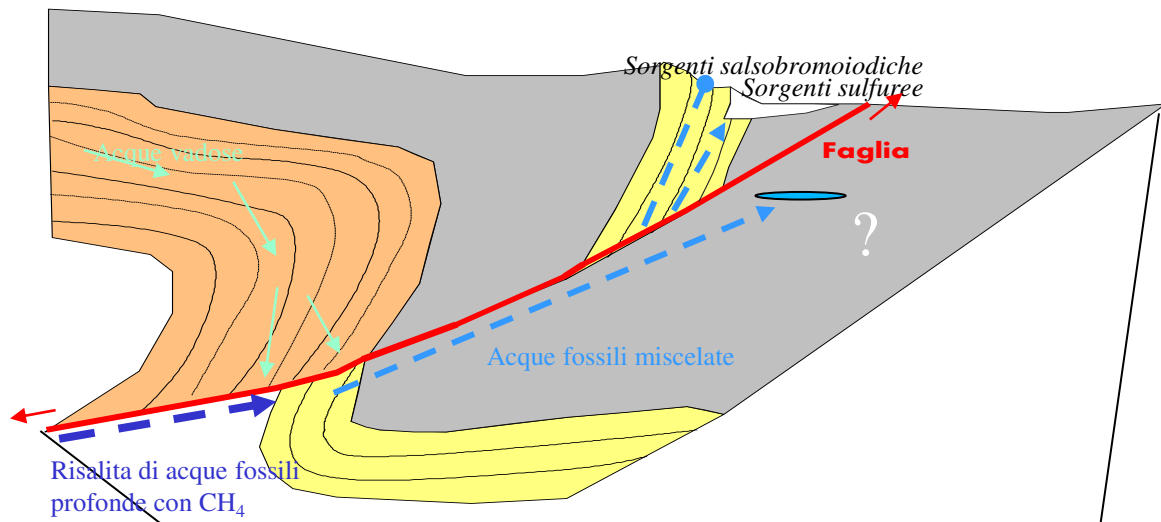


Figura 3.2.1: Relazione tra rapporto isotopico e contenuto di omologhi superiori. B = gas biogenico; M = gas misto; Tc = gas a condensati; **TT(m) = gas molto termogenico da materia organica di tipo marino**; TT0(h) = gas molto termogenico da materia organica di tipo terrestre (humico) (Borgia, G.C. et al.; 1985)

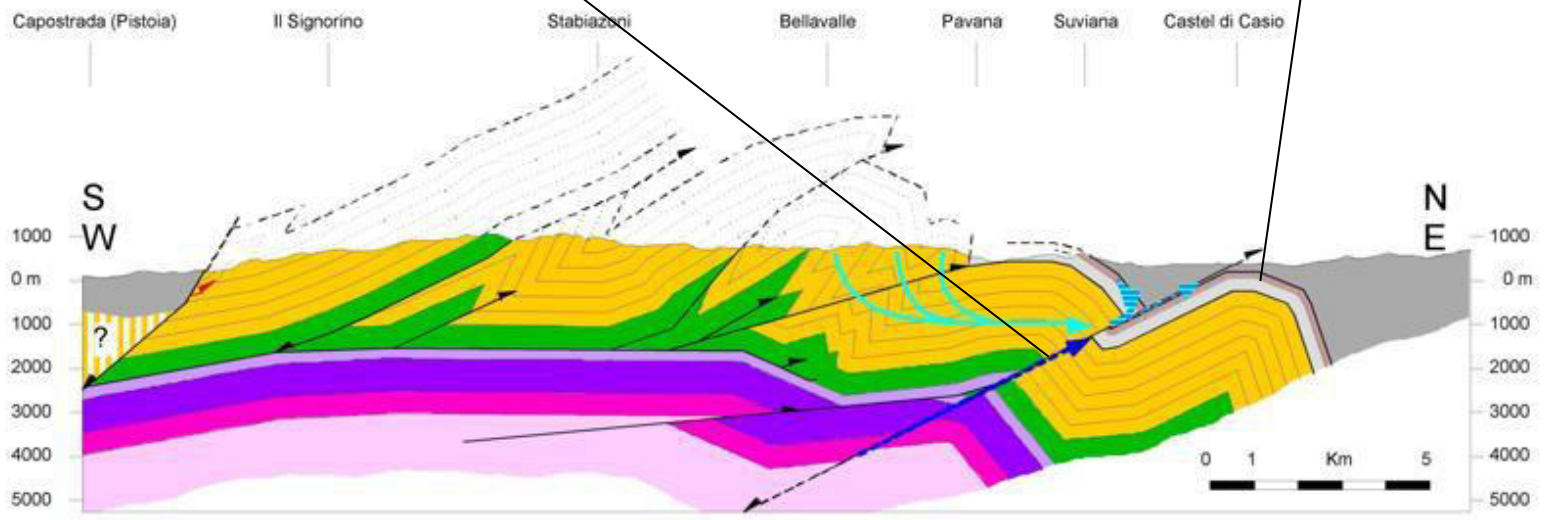




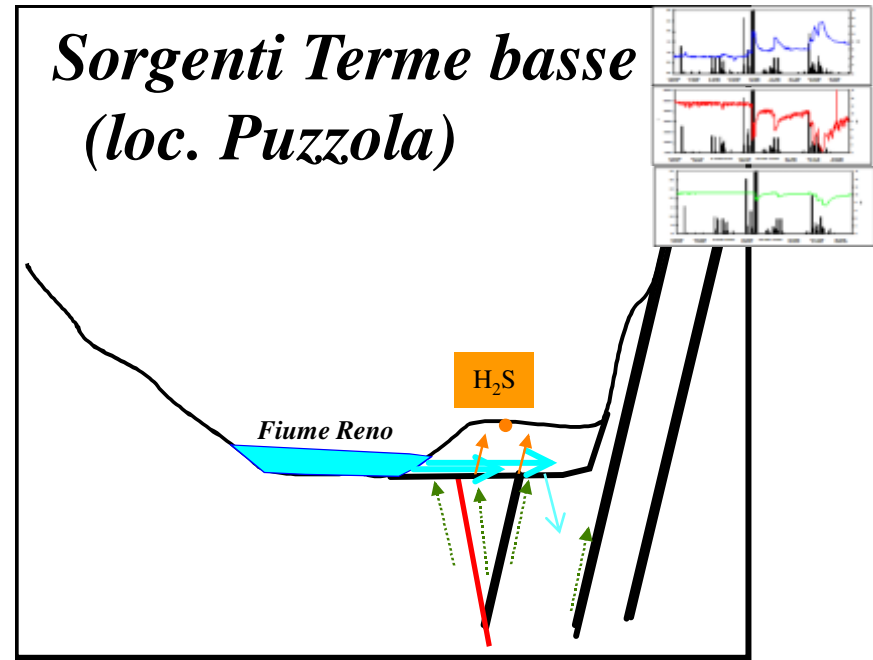
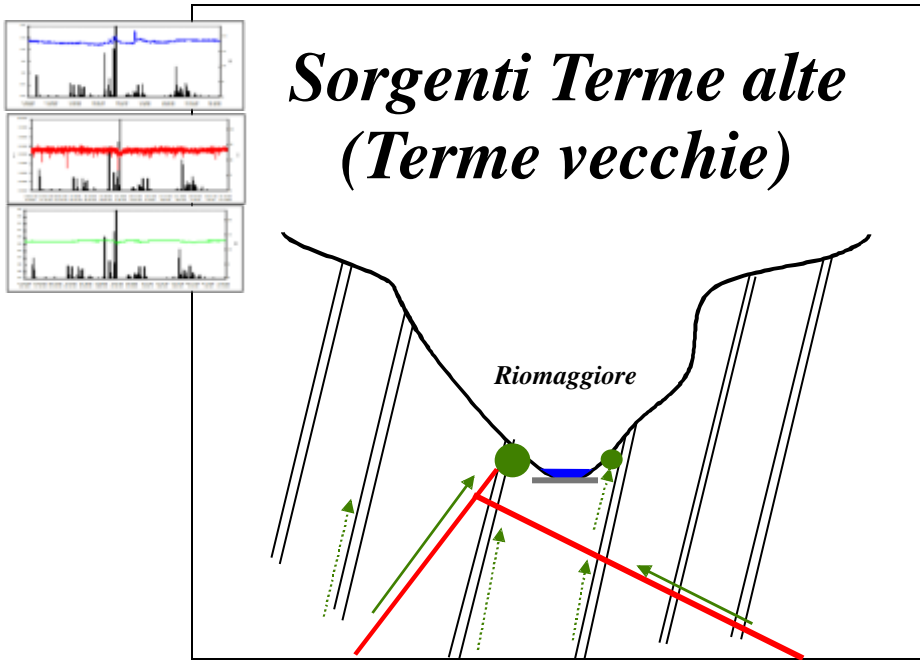


Risalita di acque fossili profonde con CH₄

- Depositi Quaternari**
- Arenarie di Suviana (Arenarie di Porretta)**
- Marnosa arenacea (Arenarie del Cervarola)**
- Unita' Argillitiche**



- 1
- 2
- 3
- 4
- 5
- 6
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- 8
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- 11
- 12



Acque termali salsobromoioidiche
 Acque fredde di subalveo
 Acque termali sulfuree

~~*THIOBACILLUS FERROXIDANS*~~

~~$2 \text{FeS}_2 + 3 \text{O}_2 + 2 \text{H}_2\text{O} \leftrightarrow 2\text{FeSO}_4 + 2\text{H}_2\text{S}$~~

~~Ph < 7 FeSO₄??~~

~~O₂ >> 0~~

Ph	Puzzola I	Porretta Nuova	Sale	Bove
Anhydrite		-3.6	-3.98	-3.86
Aragonite	0.03	-0.34	-0.13	0.04
Calcite	0.17		0.01	0.18
Dolomite	-0.04	-0.34	0.04	0.32
Fluorite	-0.6	-1.24		-0.64
Gypsum	-2.77	-3.4	-3.82	
Halite	-4.7	-5.05	-4.07	-4.05

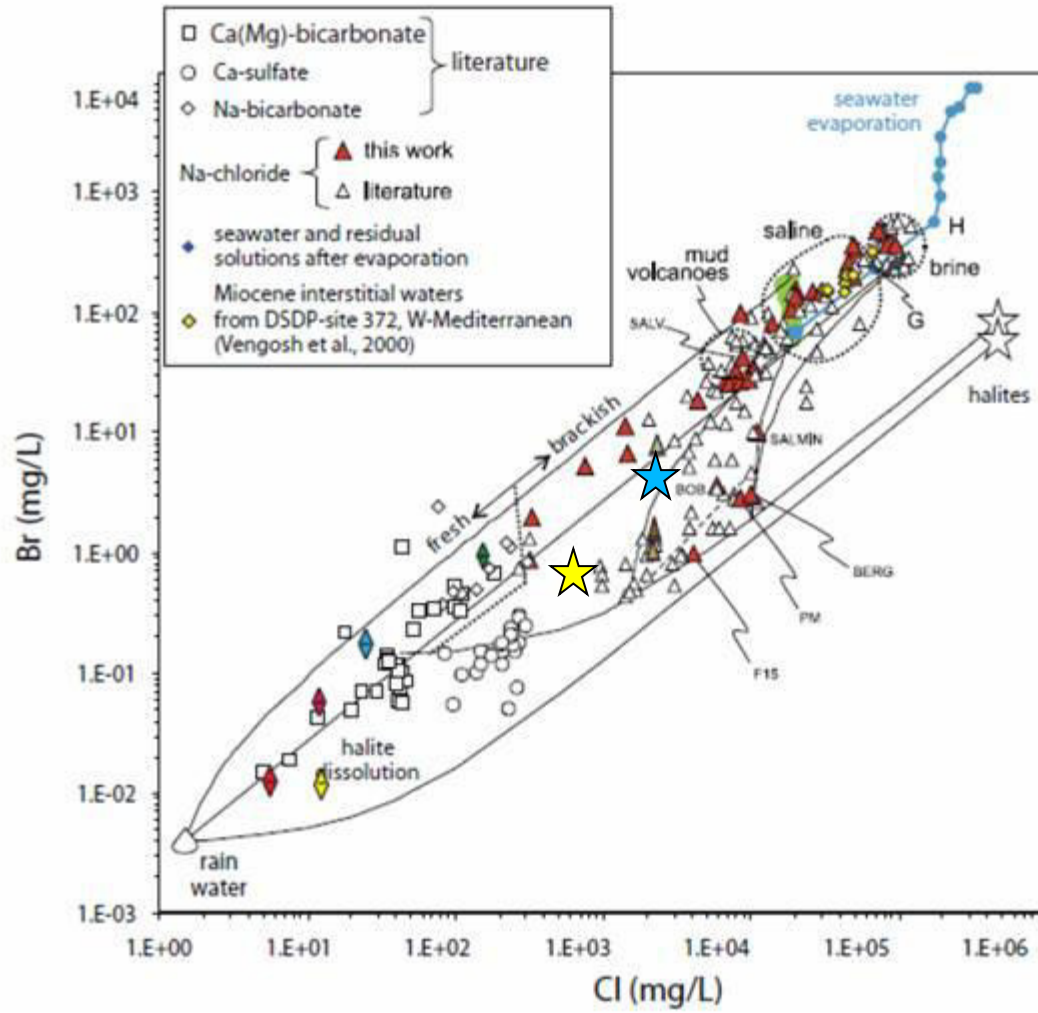
Desulfovibrio Desulfuricans

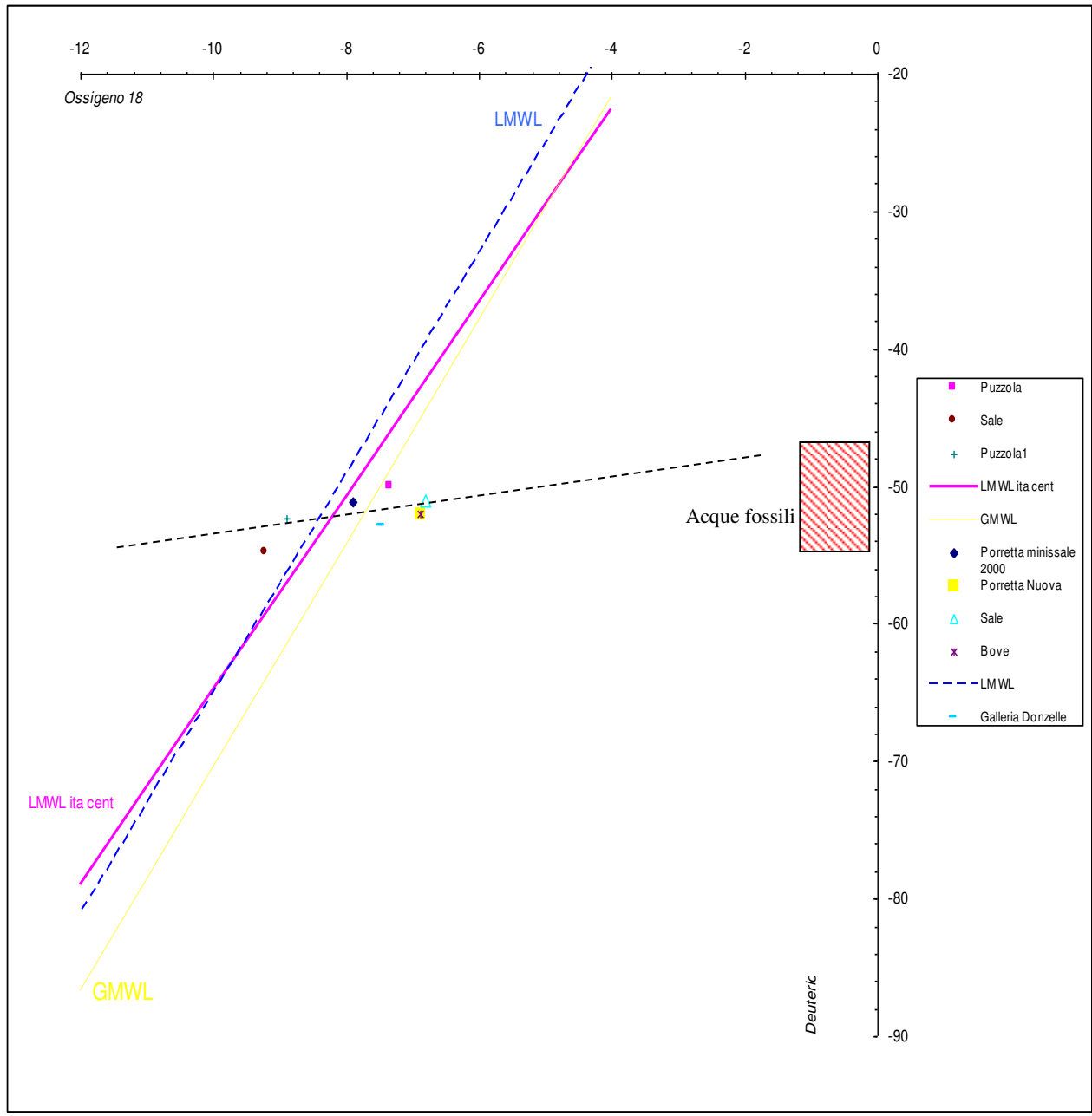


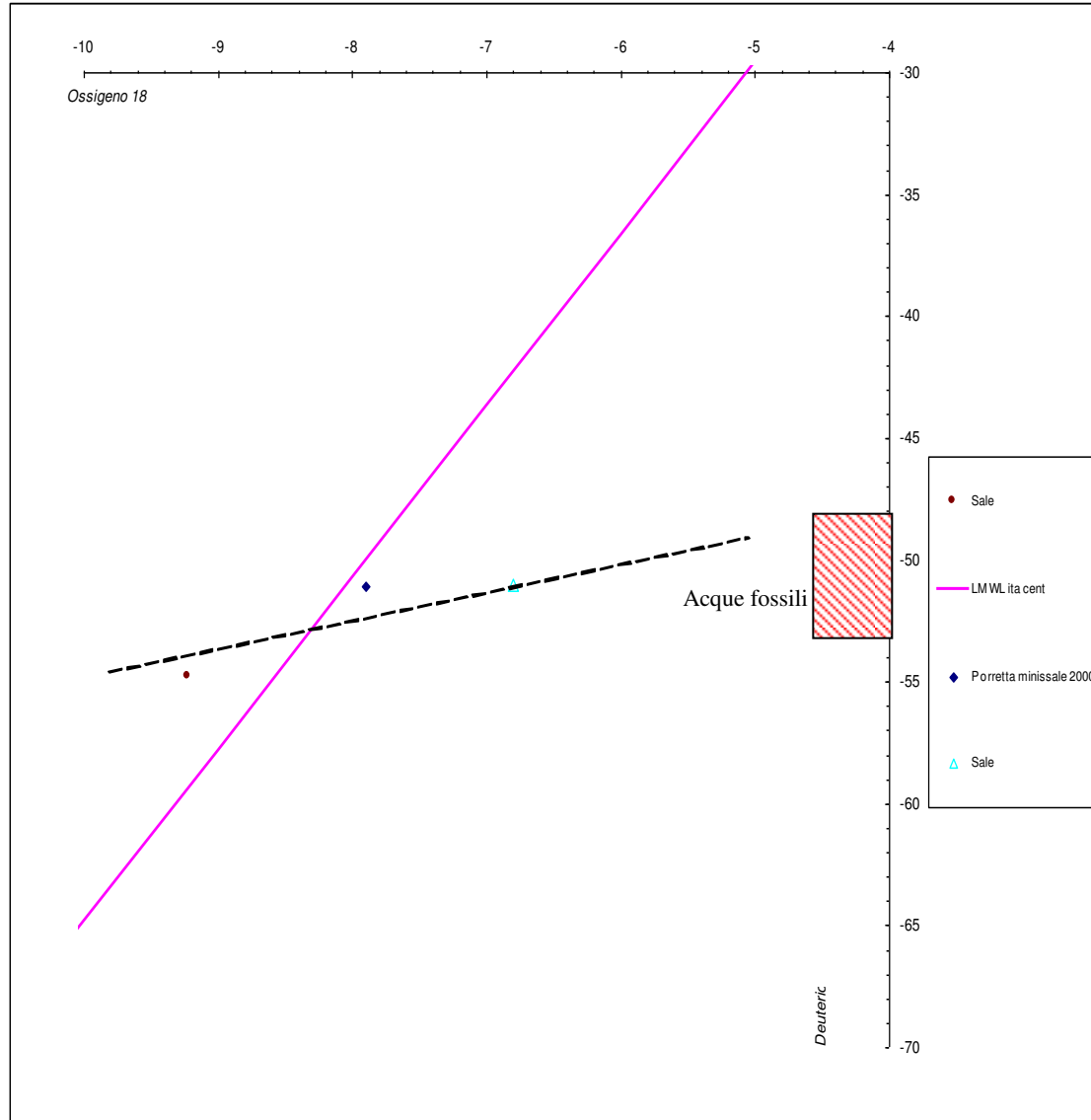
$\text{CH}_4 > 0$

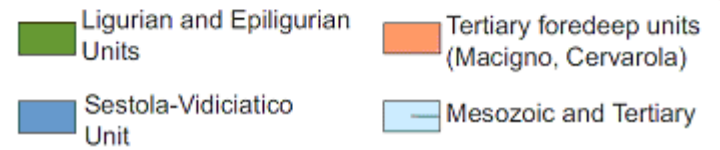
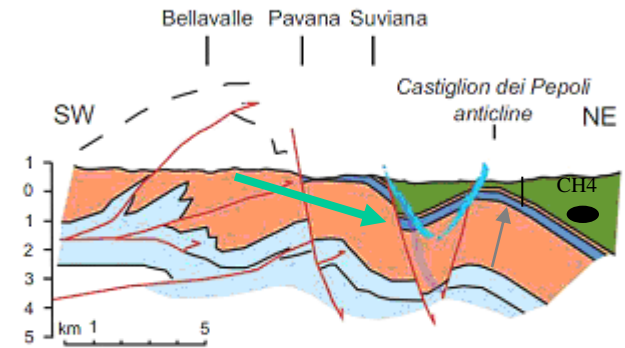
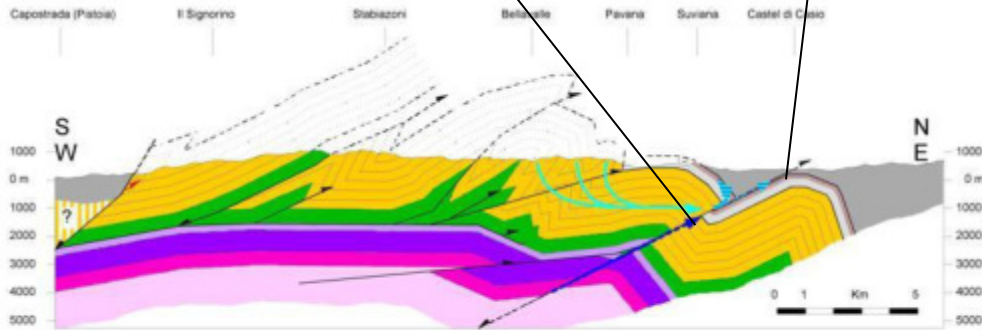
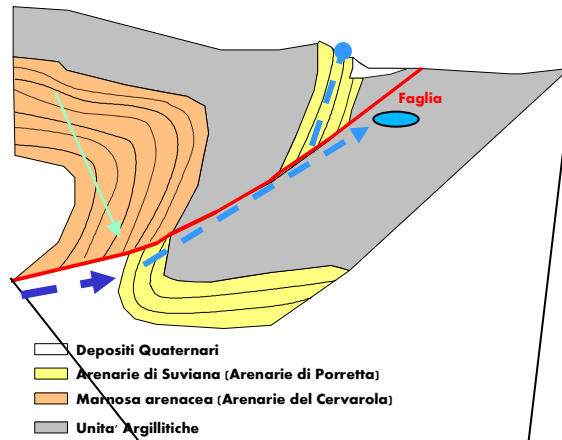
$\text{O}_2 = 0$

GRAFICO BROMO Vs CLORO









Da Capozzi & Picotti, 2010