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$SO_4^-$

Organic Matter

Fe Minerals

$H_2S$

$S^0$, $S_x^{2-}$, etc.

Bacteria

FeS

Bacteria

FeS$_2$

Pyrzite
oxic/dysoxic/fluctuating redox/anoxic with high sed. rate

Fe/Fe

Fe/py/Fe/hr

oxic
possibly anoxic
euxinic
possibly euxinic
anoxic

ferruginous marginal marine/reeveded
Siliciclastic accumulation rate (g m\(^{-2}\) yr\(^{-1}\))

Fe\(_T\)/Al (average euxinic minus local oxic baseline)

- Black Sea (euxinic Unit 1): DOP = 0.72
- Effingham Inlet: DOS = 0.59
- Orca Basin: DOS = 0.76
- Cariaco Basin: DOP = 0.55
- Black Sea (euxinic margin): DOP = 0.40
A plot showing the change in $\Delta \text{Fe}_T/\text{Al}$ vs. temperature (°C).
Organic C < 0.5% and Fe_T < 0.5%

Late diagenetic or metamorphic iron minerals abundant

(1) Overgrowths, vein, coarse or corroded pyrite present
(2) Pyrrhotite or other metal sulphides abundant

(1) No enrichment if local Fe_T/Al not exceeded
(2) No enrichment for Fe_T/Al = 0.55 to 0.66
(3) Ferruginous or euxinic waters unconfirmed without proxy or geological evidence
(4) Hydrothermal input unconfirmed without geological evidence

Iron Enrichment

(1) Consider local Fe_T/Al
(2) No local threshold data
(3) Fe_T/Al = 0.66 to 2.0
(4) Fe_T/Al > 2.0

Organic C > 0.5% and Fe_T > 0.5%

Avoid (1), (2), (3) and (4) by subsampling

Compositional Constraints
(that ensure significant sulfate reduction)

Addition/Loss of S

(1) Pyrite texture
(2) Pyrrhotite or other metal sulphides present

(1) Overgrowths, vein, coarse or corroded pyrite absent.
(2) All indices valid if pyrrhotite or metal sulphides present at low concentrations

All indices valid if late diagenetic or metamorphic iron minerals present at low concentrations.

Local Redistribution of Non-Sulfidic Fe

Textural evidence for late diagenetic or metamorphic Fe minerals

Late diagenetic or metamorphic iron minerals abundant