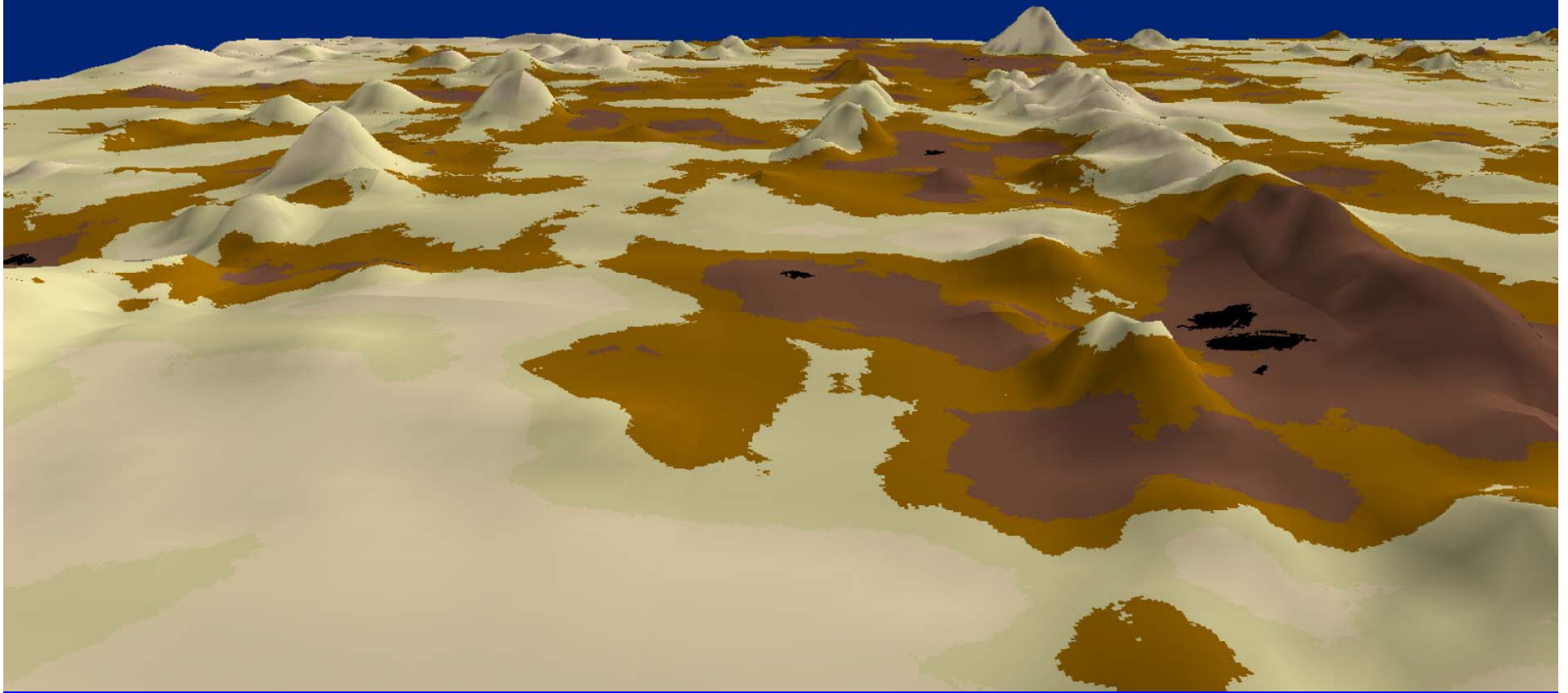


# BIOGEOCHEMICAL MODEL SUMMARY



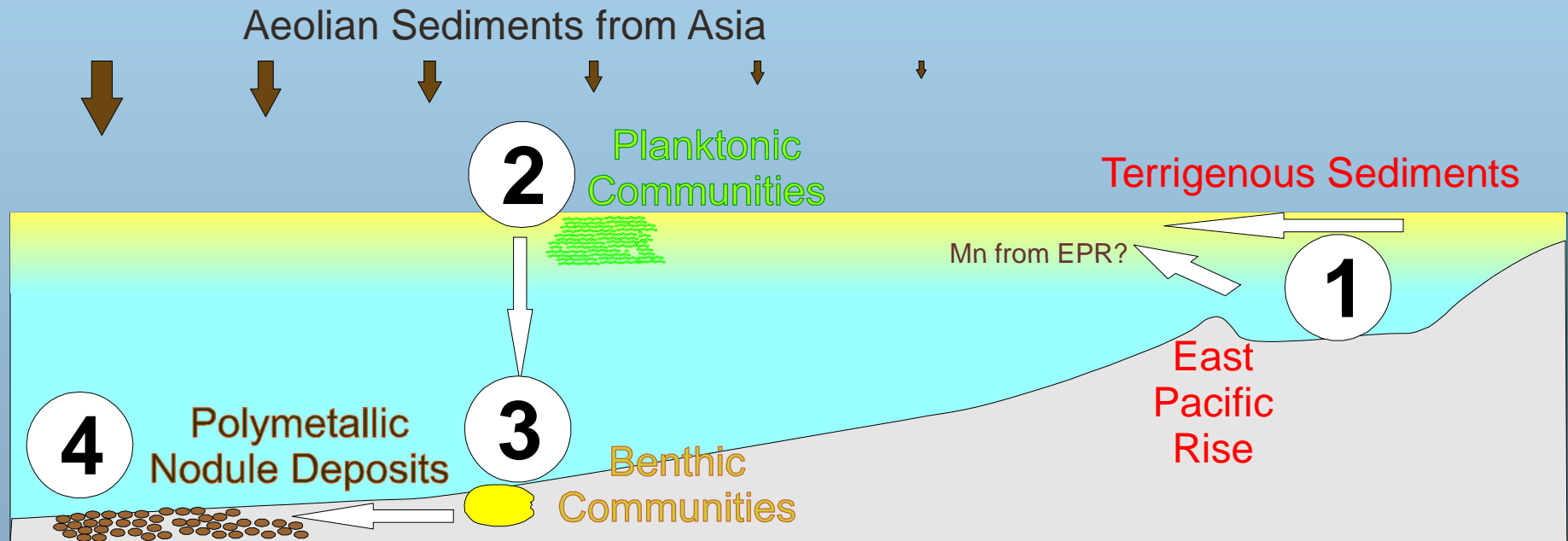
# ITEMS FOR DISCUSSION

- **HYPOTHESIS**
- **PROXY VARIABLES**
- **REGRESSION MODEL**
- **RESULTS**
- **PREDICTED METAL CONTENT DISTRIBUTIONS**

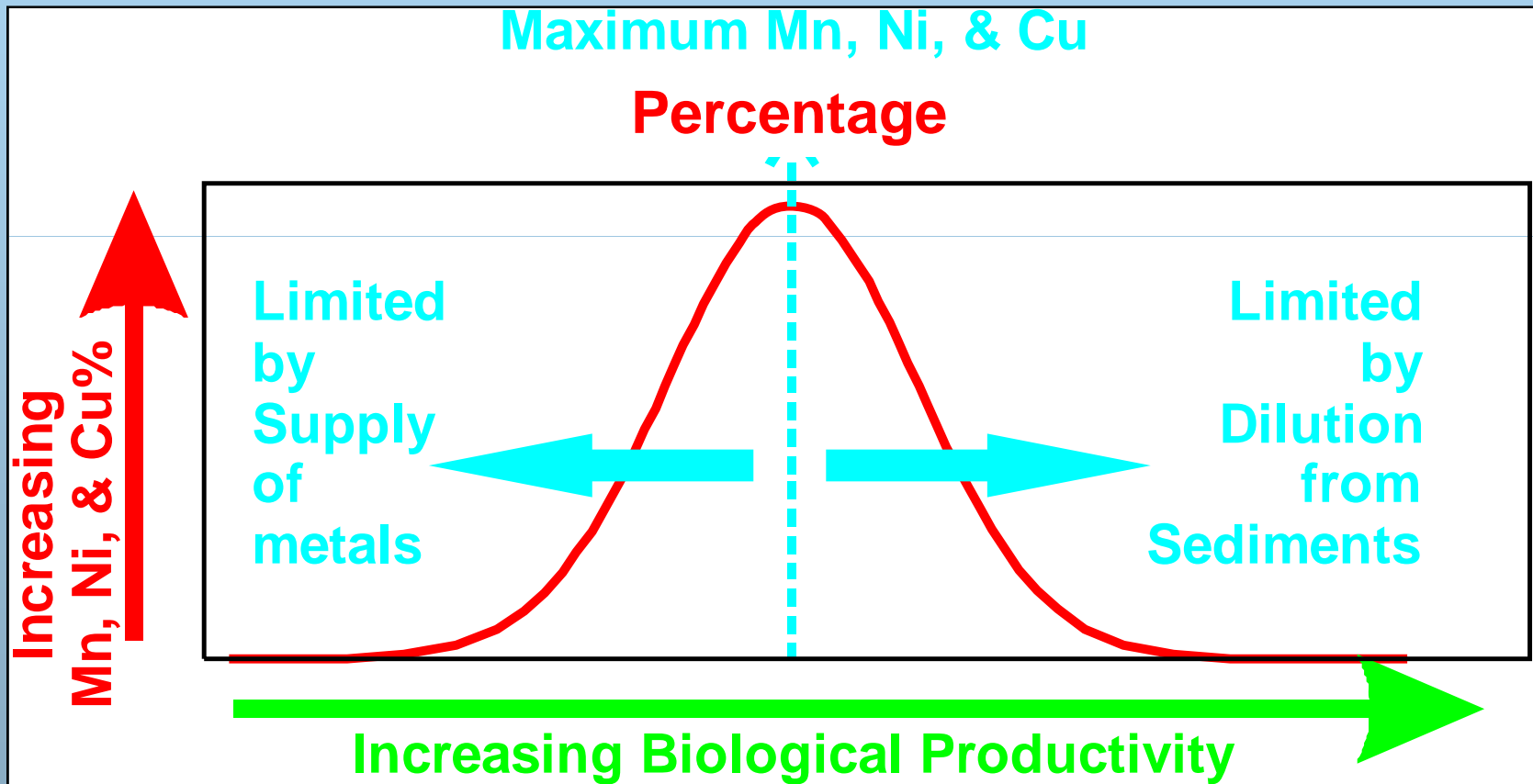


# BIOGEOCHEMICAL MODEL: GENERAL HYPOTHESIS

1. Sources of metals: Land, aeolian, and possibly East Pacific Rise
2. Sediment particles consumed by biota; converted to larger fecal pellets that sink
3. Fecal pellets metabolized by benthic fauna, releasing reduced metals
4. Reduced metals incorporated into nodules



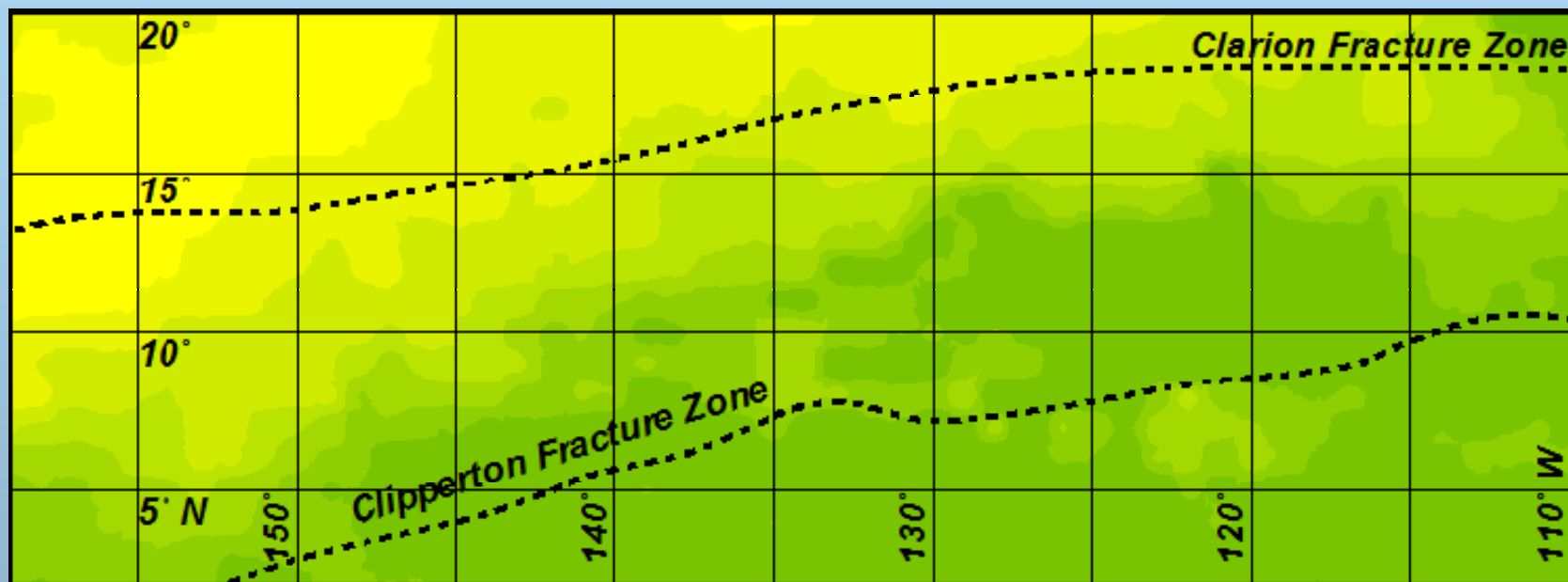
# PROPOSED SECOND ORDER RELATIONSHIP WITH PRIMARY PRODUCTIVITY



# PROXY VARIABLES

- SURFACE WATER CHLOROPHYLL (PRIMARY PRODUCTIVITY)
- DISTANCE FROM LAND & EPR
- WATER DEPTH – CCD (DEL)

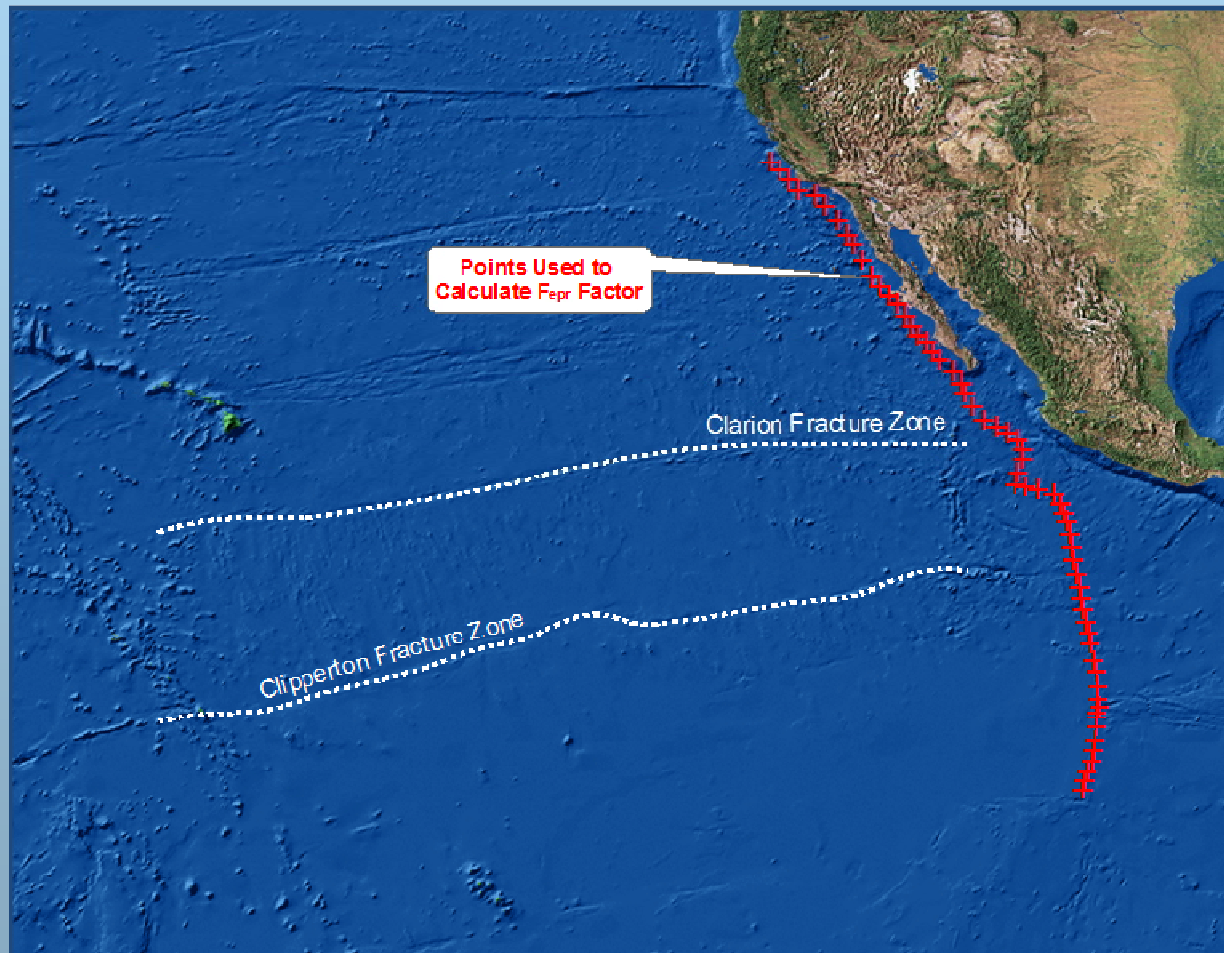
# PROXY 1: CHLOROPHYLL (chlor)



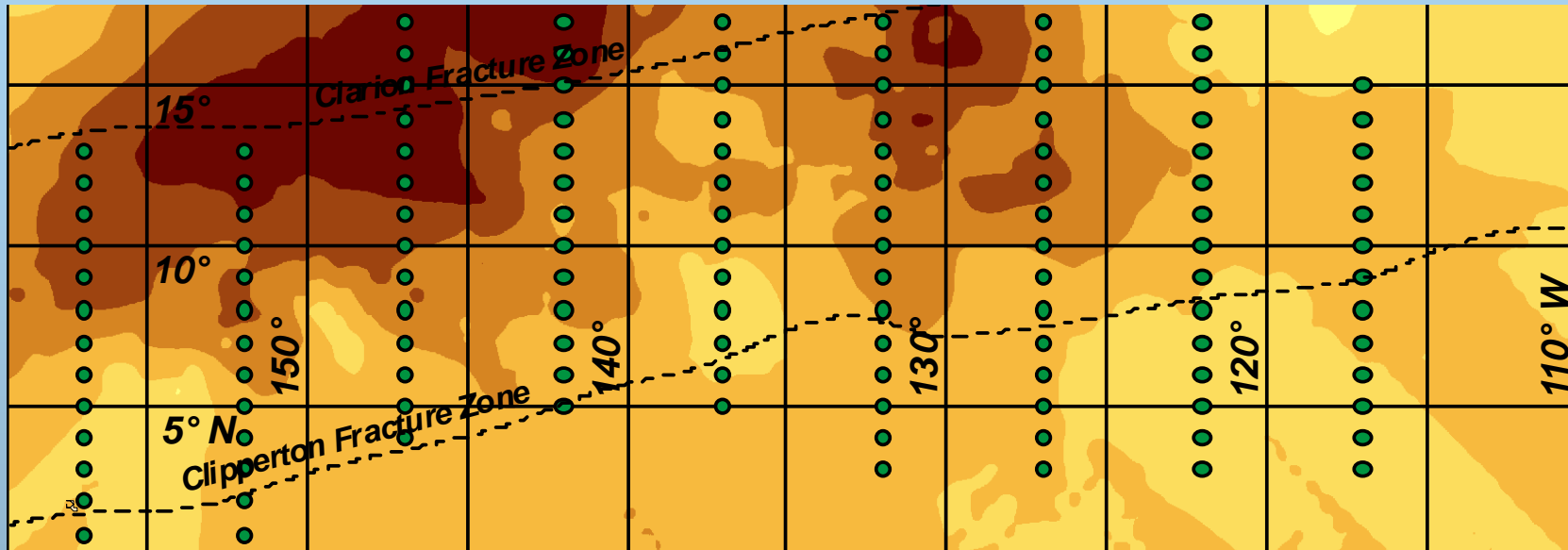
**Surface Water  
Chlorophyll (µg/l)**



# PROXY 2: DISTANCE FROM LAND & EPR ( $F_{epr}$ )

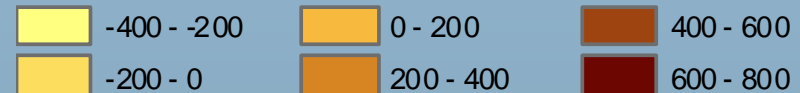


# PROXY 3: WATER DEPTH – CCD (DEL)



● CCD Data Point

Del (Water Depth - CCD, meters)





# REGRESSION MODEL

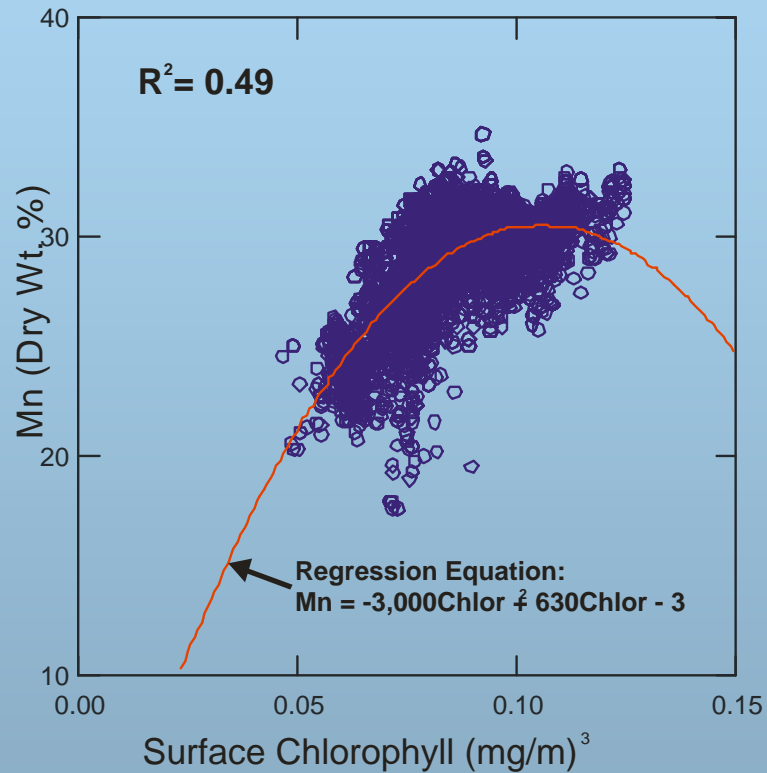
$$\text{METAL \%} = f(\text{chlor}^2, F_{\text{epr}}, \text{del})$$



# RESULTS: Mn

Chlor	del	F <sub>epr</sub>	r	R <sup>2</sup>
X			0.70	0.49
	X		0.14	0.02
		X	0.34	0.13
X	X		0.75	0.56
X		X	0.70	0.49
	X	X	0.41	0.17
X	X	X	0.75	0.56

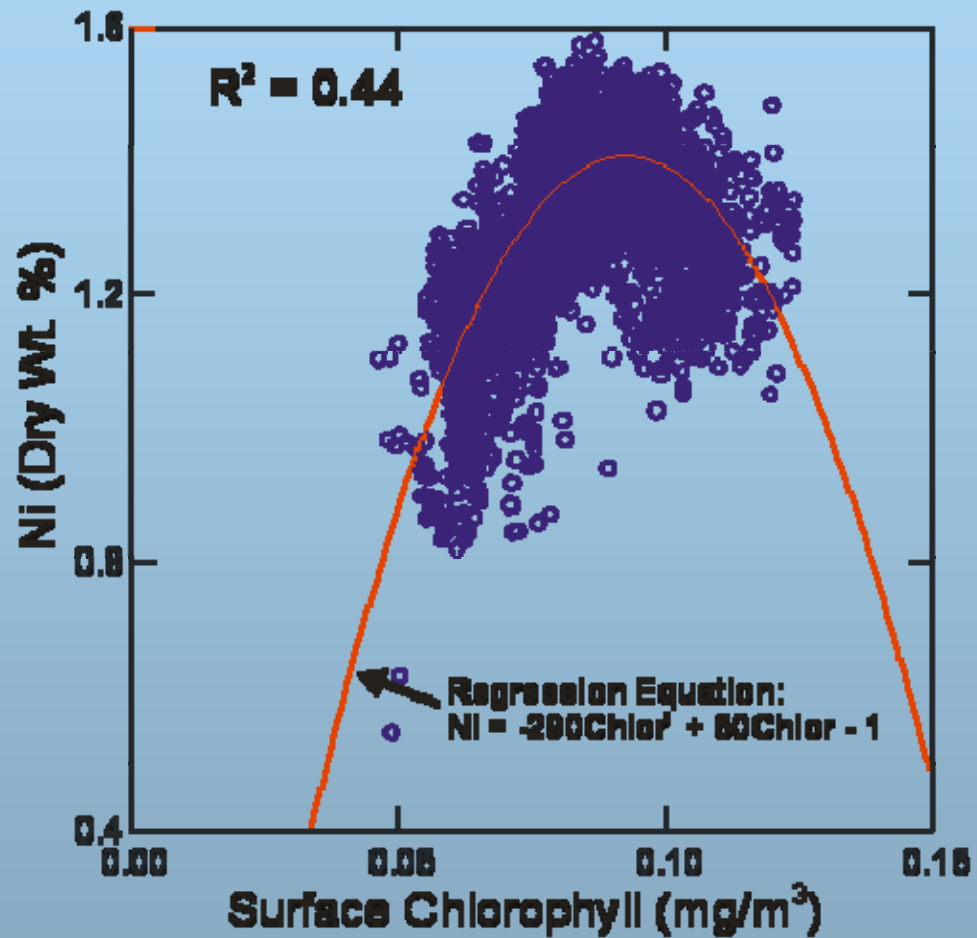
r = Pearson Correlation Coefficient  
 R<sup>2</sup> = Coefficient of Determination  
 = r<sup>2</sup>



# RESULTS: Ni

Chlor	del	F <sub>epr</sub>	r	R <sup>2</sup>
X			0.66	0.44
	X		0.05	0.003
		X	0.07	0.005
X	X		0.69	0.48
X		X	0.69	0.48
	X	X	0.07	0.005
X	X	X	0.69	0.48

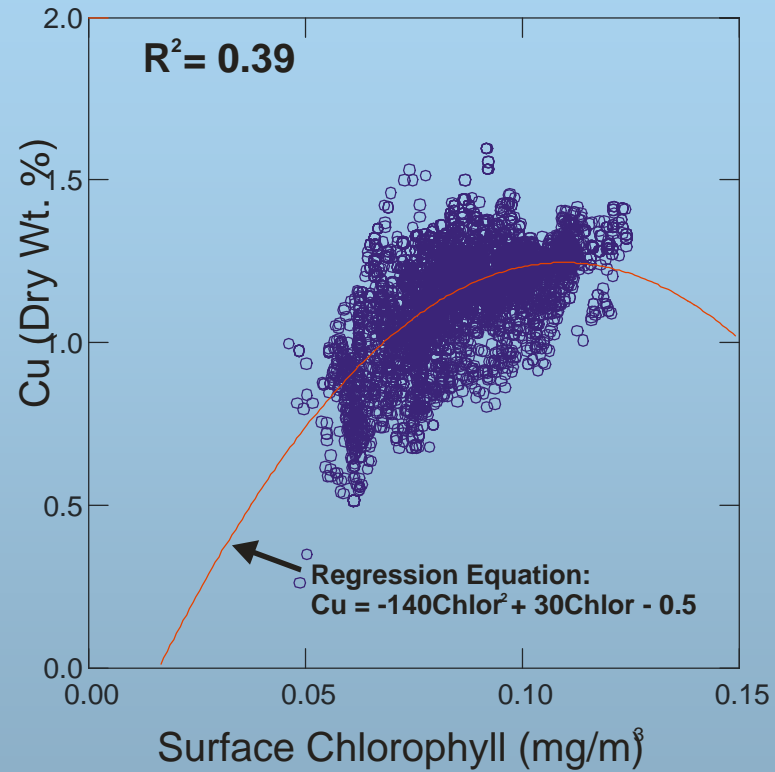
r = Pearson Correlation Coefficient  
 R<sup>2</sup> = Coefficient of Determination  
 = r<sup>2</sup>



# RESULTS: Cu

Chlor	del	F <sub>epr</sub>	r	R <sup>2</sup>
X			0.62	0.39
	X		0.46	0.21
		X	0.18	0.034
X	X		0.70	0.49
X		X	0.65	0.42
	X	X	0.32	0.10
X	X	X	0.71	0.51

r = Pearson Correlation Coefficient  
 R<sup>2</sup> = Coefficient of Determination  
 = r<sup>2</sup>



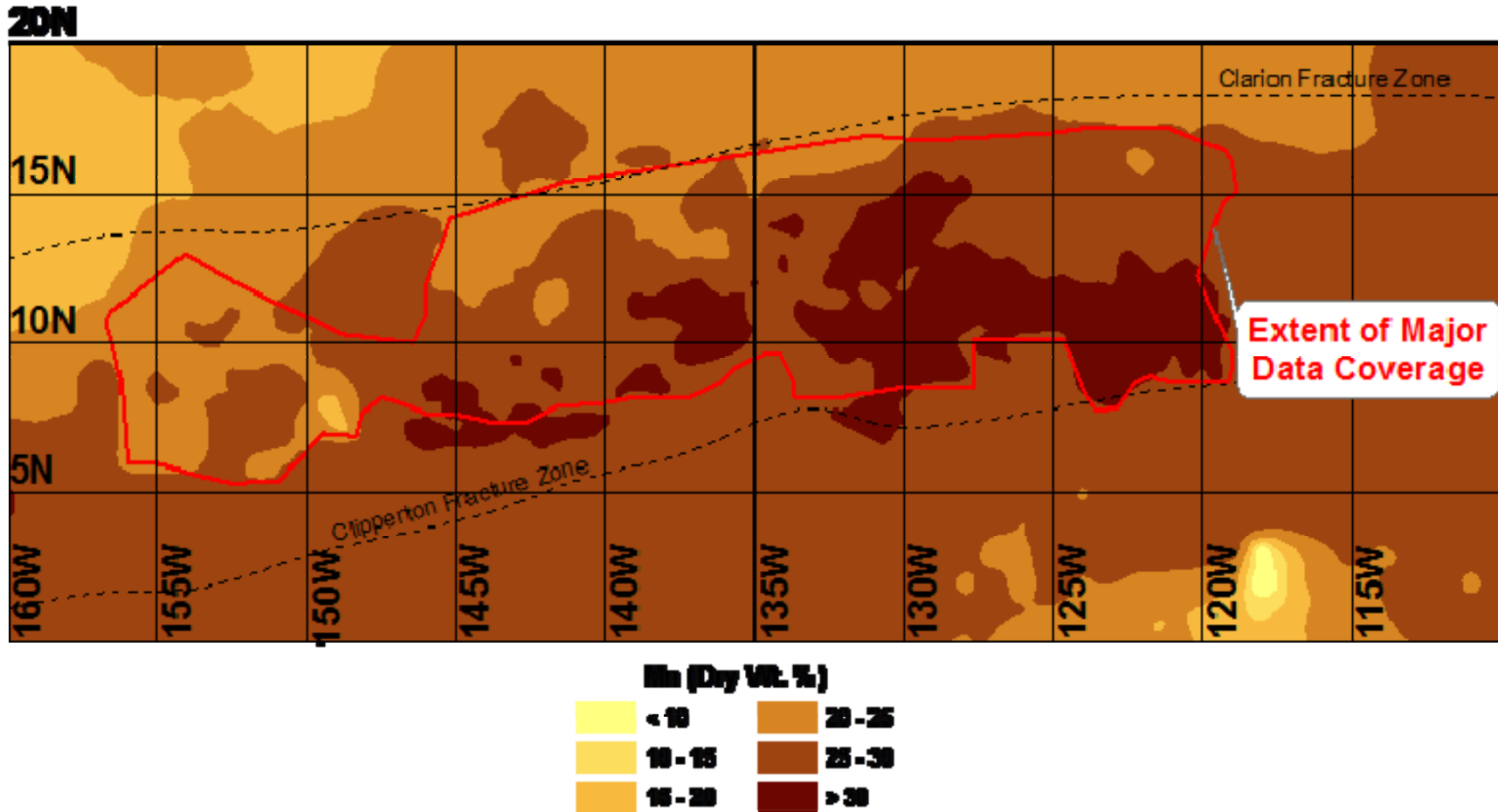
# COMPARISON OF REGRESSIONS

Proxy Variables in Regression	R <sup>2</sup>		
	Mn	Ni	Cu
Chlor	0.49	0.44	0.39
Chlor, del	0.56	0.48	0.49
Chlor, F <sub>epr</sub>	0.49	0.48	0.42
Chlor, del, F <sub>epr</sub>	0.56	0.48	0.51

# SUMMARY OF RESULTS

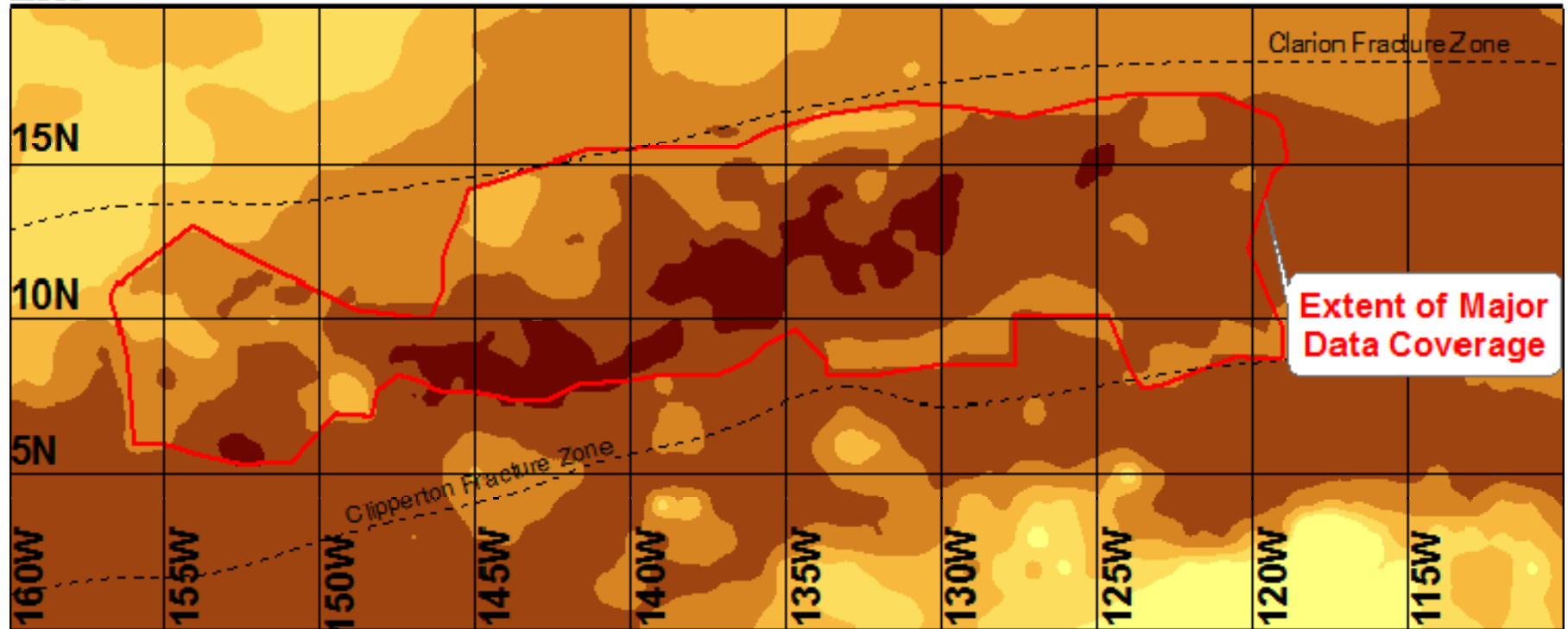
- CHLOROPHYLL DOMINATES REGRESSION
- POTENTIALLY SIGNIFICANT INFLUENCE FROM del

# PREDICTED MN DISTRIBUTION



# PREDICTED NI DISTRIBUTION

20N



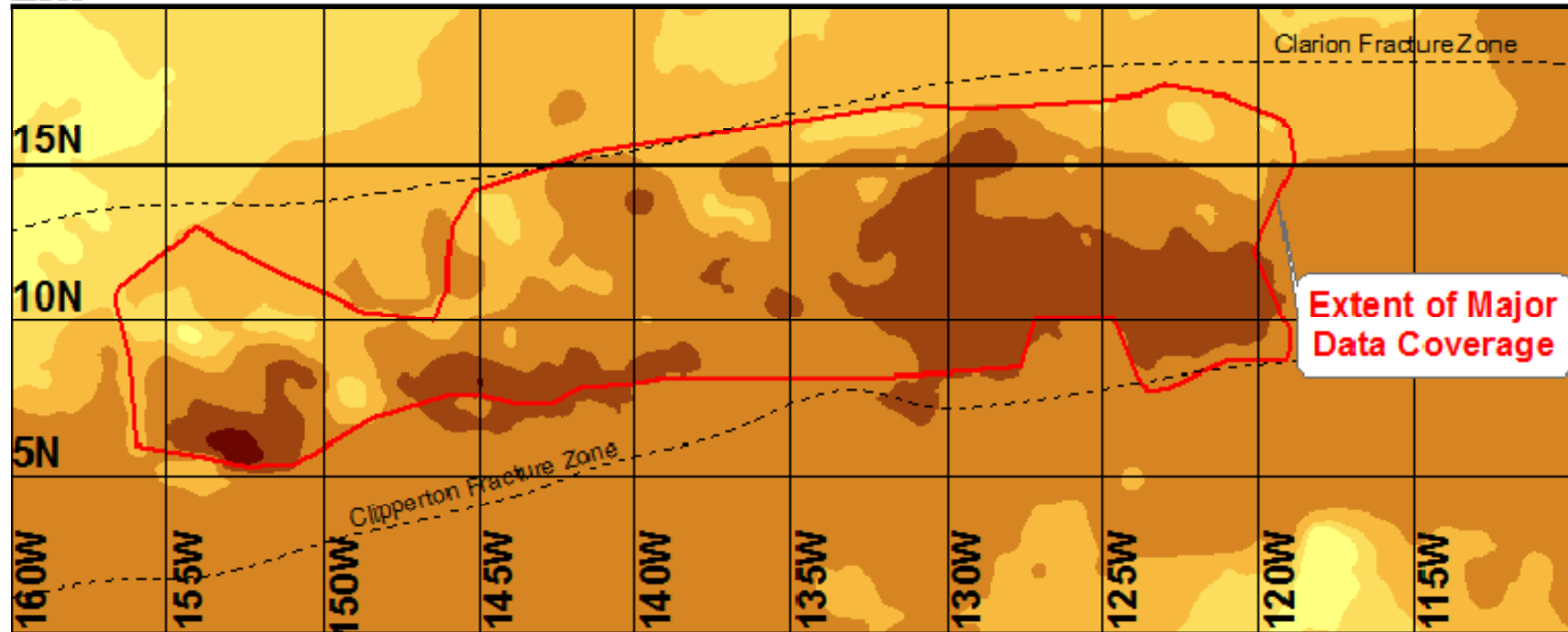
mg/kg (dwt)





# PREDICTED CU DISTRIBUTION

20N



**Cu (Dry Wt. %)**



# SUMMARY

- ***HYPOTHESIS SUPPORTED BY DATA***
- ***CHLOROPHYLL DOMINANT***
- ***del POSSIBLY SIGNIFICANT***

