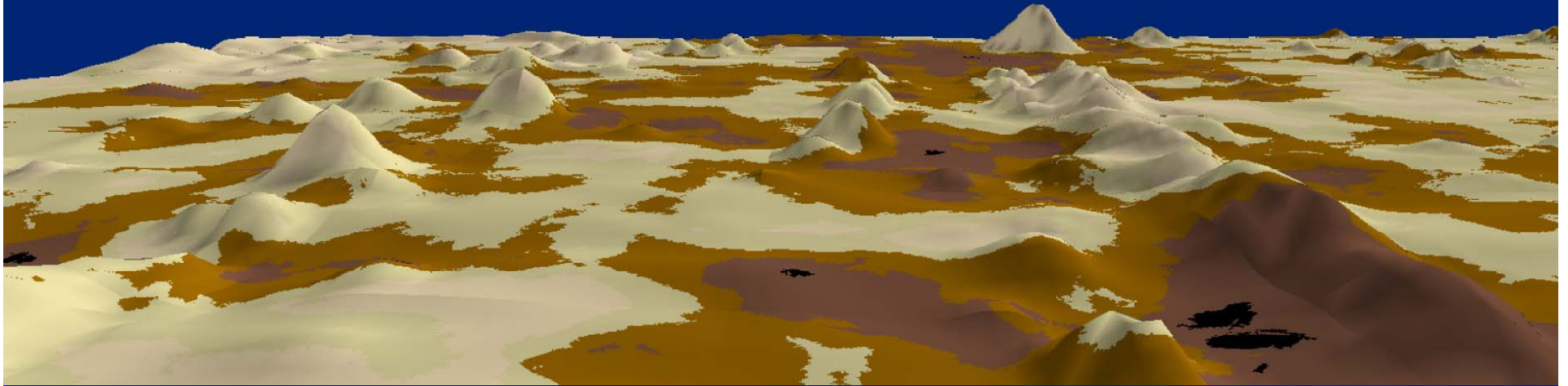


# GIS AND GEOSTATISTICAL APPRAISAL OF ABUNDANCE

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Young Tak Ko, Jonguk Kim, and Seungjin Yang



# ITEMS FOR DISCUSSION

- **SUMMARY OF KRIGING TECHNIQUES**
- **METHODS USED**
- **RESULTS**
- **COMPARISON WITH INDEPENDENT ASSESSMENT**



# KRIGING

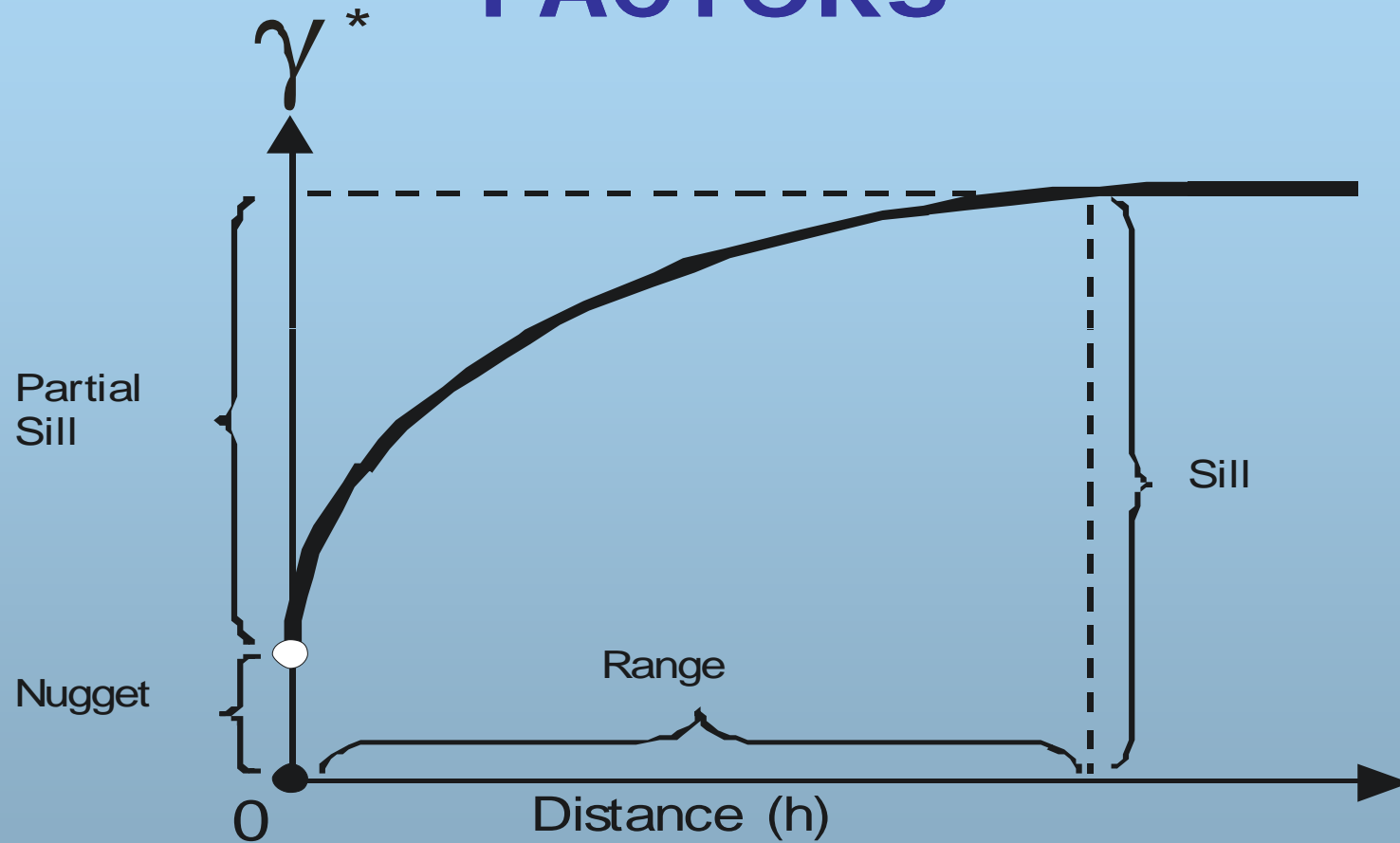
- **STANDARD METHOD OF RESOURCE ASSESSMENT**
- **USES EXISTING DATA DISTRIBUTION TO DEFINE INTERPOLATION**



# KRIGING: THE VARIOGRAM

$$2\gamma^*(h) = \frac{1}{n(h)} \sum_{i=1}^{n(h)} [Z(x_i) - \bar{Z}(h)]^2$$

# VARIOGRAM FACTORS

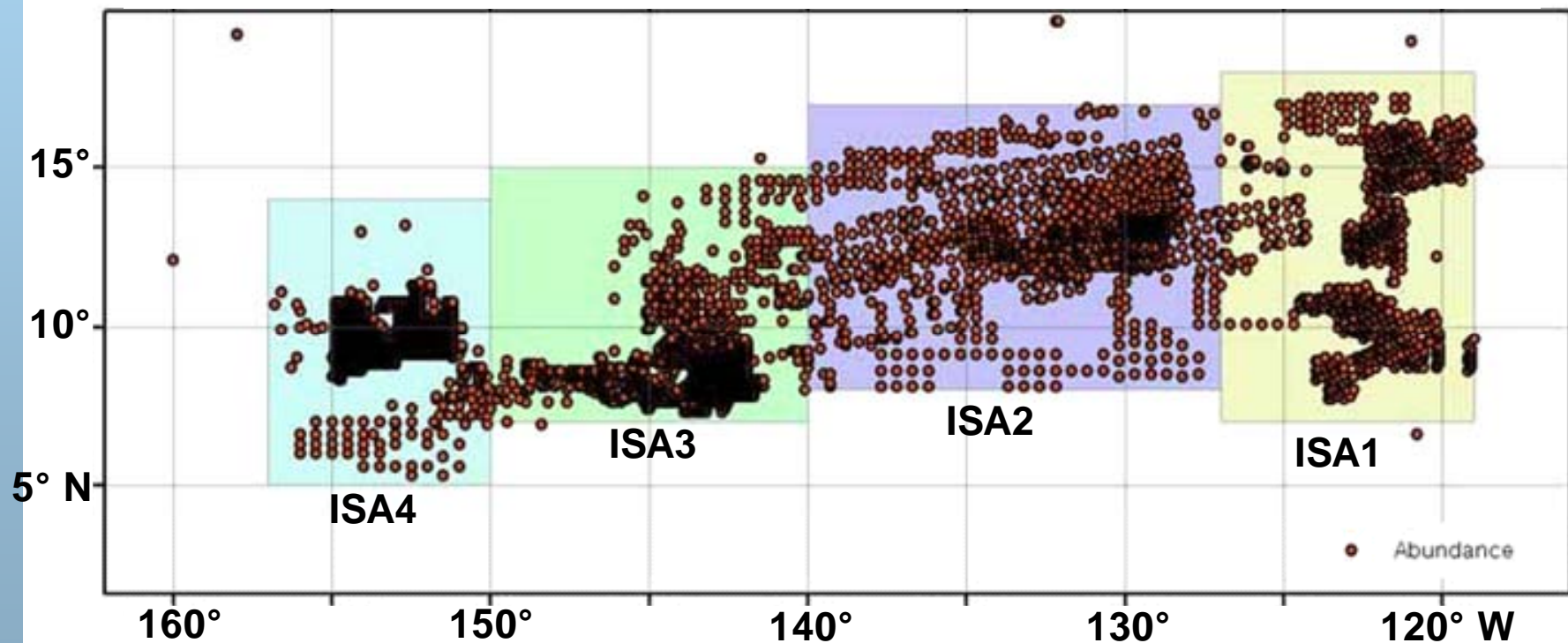


# SEQUENTIAL INDICATOR SIMULATION

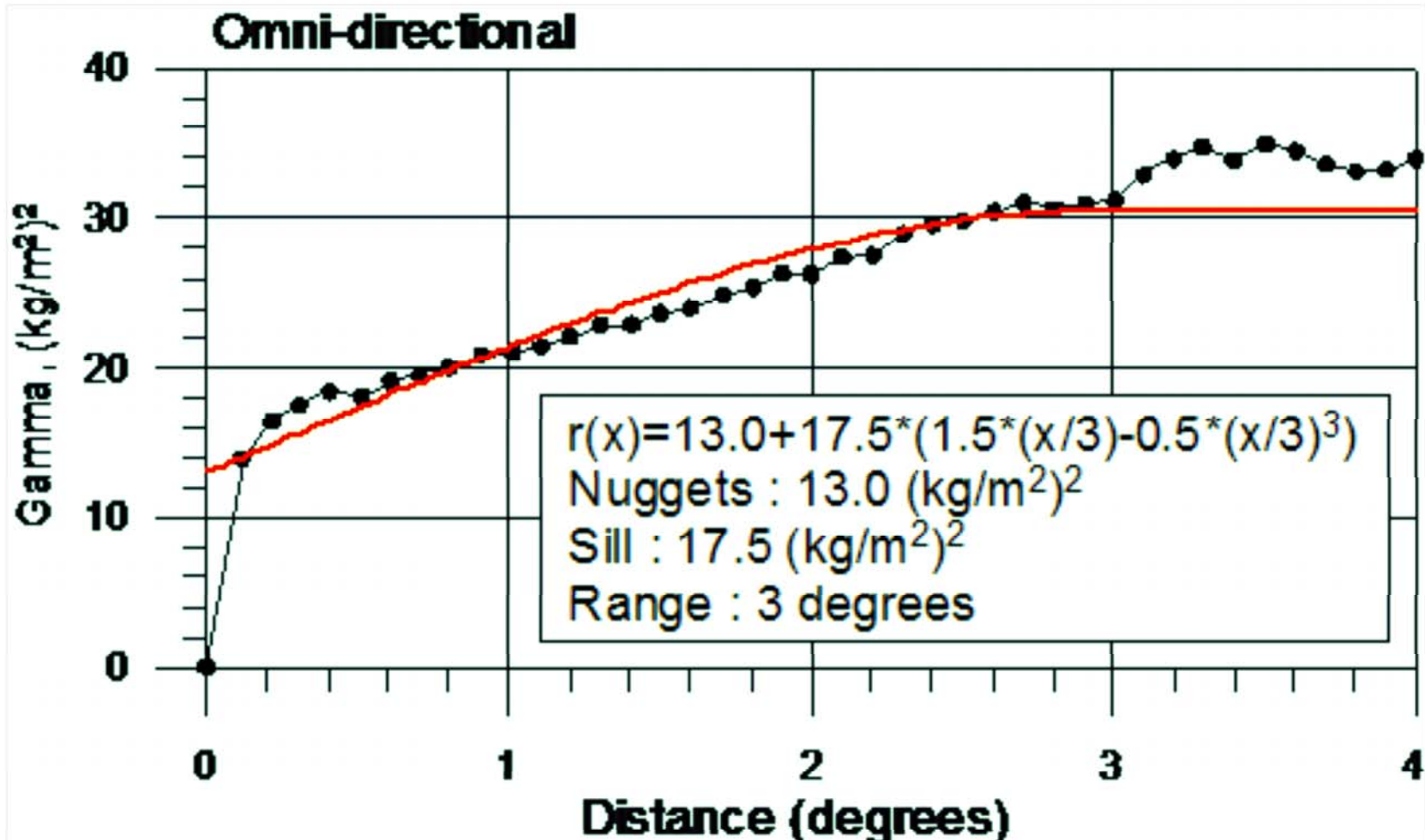
- **SIMULATES DATA IN UNSAMPLED AREAS**
- **WORKS WITH KRIGING TO DEFINE RANGE OF ASSESSMENT PREDICTIONS**



# DATA REDUCTION: STUDY BLOCKS



# ABUNDANCE VARIOGRAM



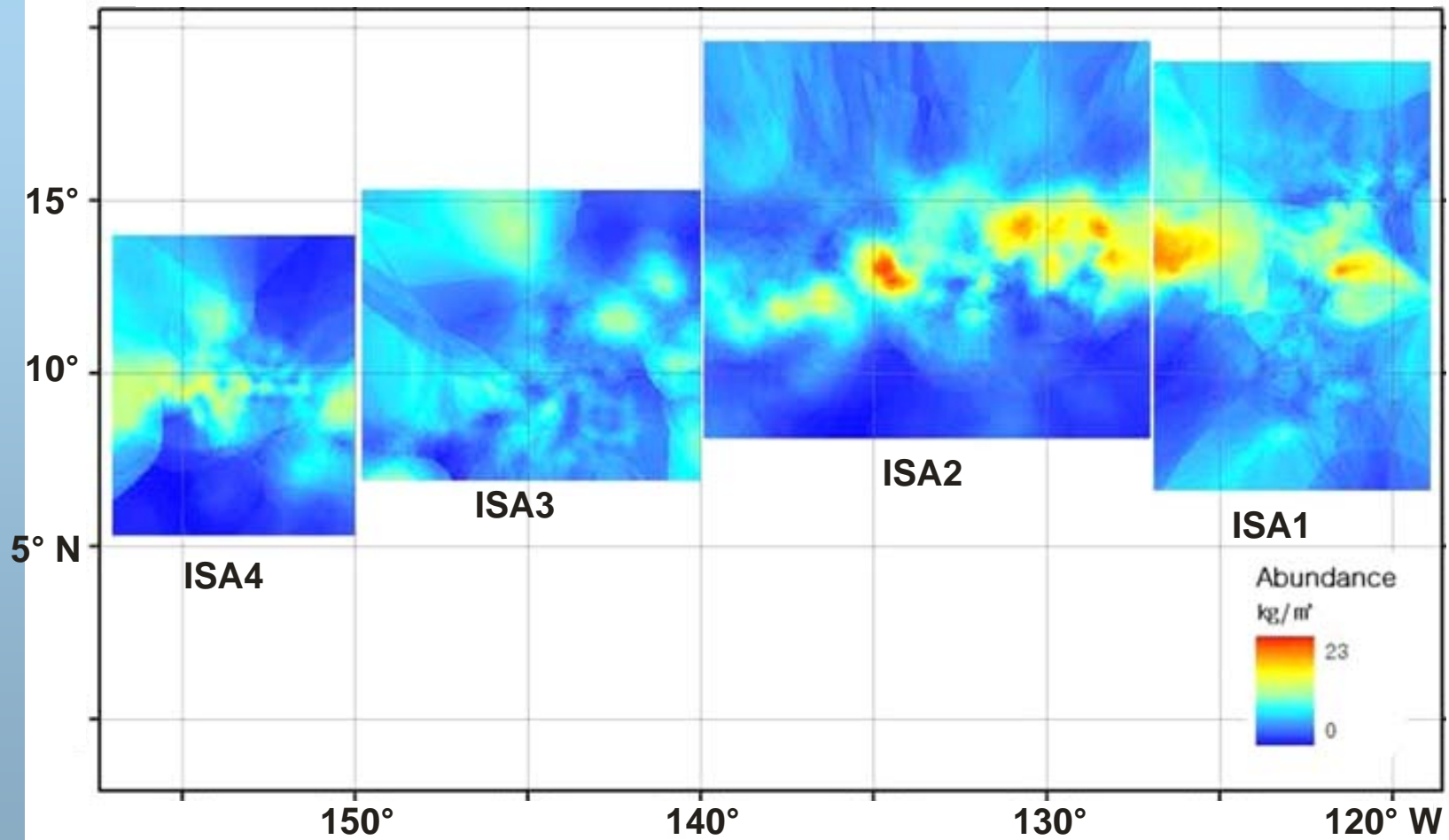


# RESULTS: ABUNDANCE

Abundance (kg/m <sup>2</sup> )	Raw Data	OK	SIS Realizations		
			R1	R2	R3
Mean	6.72	5.29	7.26	6.9	7.23
Std. Error	0.09	0.01	0.03	0.03	0.03
Median	5.47	4.93	4.88	4.58	5
Minimum	0.01	0.01	0.01	0.01	0.01
Std. Dev.	5.52	3.17	8.03	7.78	7.94
Range	30.48	10.04	64.4	60.49	62.98
No. Points	3,622	57,819	63,571	63,571	63,571



# RESULTS



# COMPARISON WITH INDEPENDENT ASSESSMENT

Source	Included Area (km <sup>2</sup> X 10 <sup>6</sup> )	Estimated Tons (metric tons X 10 <sup>6</sup> )				
		Nodules	Mn	Co	Ni	Cu
<b>Table 4.8</b>	3.83	21,100	5,950*	46.4*	270*	234*
<b>Table 4.7</b>	4.19	30,700	8,657*	67.5*	393*	341*
<b>Table 5.1</b>	4.85	27,100	7,300	58.0	340	290

\*Estimated using mean metal content values from Table 3.3

# SUMMARY

- ***RESOURCE ASSESSMENT BASED ON CONVENTIONAL METHODOLOGY***
- ***DATA SUBDIVIDED INTO SIMPLE GEOMETRIES TO SIMPLIFY ANALYSIS***
- ***SIS SIMULATION BRACKETS INDEPENDENT ASSESSMENT***
- ***>20 – 30 BILLION METRIC TONS OF NODULES IN AREAS SURVEYED***

