SMS-204: Integrative marine sciences.

Rubric for data analysis, presentation and interpretation.
Based on Timmerman (USC).

Criteria:	Not addressed	Novice	Intermediate	Expert
Data selection				
Data are comprehensive, accurate and relevant. Uncertainties in the data are provided.	Data are too incomplete or haphazard to provide a reasonable basis for testing a hypothesis or establishing a relationship. Uncertainties in data are not provided.	• Some necessary data are missing or inaccurate •Uncertainties in data are provided but are incomplete. • Reader can evaluate to some degree the link between the hypotheses supported or rejected and the data provided.	Data are relevant, accurate and complete with any gaps being minor. •Uncertainties in data are provided. • Reader can fully evaluate whether the hypotheses were supported or rejected with the data provided.	Data are relevant, accurate and comprehensive. • Data may be synthesized or manipulated in a novel way to provide additional insight.
Data presentation				
Data are summarized in a logical format. Only significant digits are included. Table or graph types are appropriate. Uncertainties in the data are provided (e.g. error bars). Data are properly labeled including units. Graph axes are appropriately labeled and scaled and captions are informative and complete. No line connects between the data points. A regression line may be included to emphasize a relationship. The equation for the line is provided	• No attempt at providing significant digits only. • Labels or units are missing which prevent the reader from being able to derive any useful information from the graph. • Presentation of data is in an inappropriate format or graph type • Captions are confusing or indecipherable.	• Contains some attempt at providing significant digits. • contains some errors in or omissions of labels, scales, units etc., but the reader is able to derive some relevant meaning from each figure. • is technically correct but inappropriate format prevents the reader from deriving meaning or using it. Captions are missing or inadequate. Uncertainties are not provided.	•Data are provided with appropriate significant digits. • contains only minor mistakes that do not interfere with the reader's understanding and the figure's meaning is clear without the reader referring to the text. • Graph types or table formats are appropriate for data type. • includes captions that are at least somewhat useful. • Attempts to provide uncertainties.	• contains no mistakes • uses a format or graph type which highlights relationships between the data points or other relevant aspects of the data. • may be elegant, novel, or otherwise allow unusual insight into data • has informative, concise and complete captions. •uncertainties are provided and are correct.

Criteria:	Not addressed	Novice	Intermediate	Expert
Statistical analysis				
Statistical analysis is appropriate for hypotheses tested and appears correctly performed and interpreted with relevant values reported and explained. Choice of statistics (parametric or nonparametric) is justified.	• No statistical analysis is performed. • Statistics are provided but are inappropriate, inaccurate or incorrectly performed or interpreted so as to provide no value to the reader.	• Appropriate, accurate descriptive statistics only are provided. • Inferential statistics are provided but either incorrectly performed or interpreted or an inappropriate test was used. • Appropriate, correct inferential statistics are provided, but lack sufficient explanation.	• Appropriate Inferential (comparative) statistical analysis is properly performed and reasonably well explained. • Explanation of significant value may be limited.	• Statistical analysis is appropriate, correct and clearly explained • includes a description of what constitutes a significant value and why that value was chosen.
Conclusions based on data				
Conclusion is clearly and logically drawn from data provided. A logical chain of reasoning from hypothesis to data to conclusions is clearly and persuasively explained. Conflicting data, if present, are adequately addressed.	• Conclusions have little or no basis in data provided. • Connections between hypothesis, data and conclusion are nonexistent, limited, vague or otherwise insufficient to allow reasonable evaluation of their merit. • Conflicting data are not addressed.	• Conclusions have some direct basis in the data, but may contain some gaps in logic or data or are overly broad. • Connections between hypothesis, data and conclusions are present but weak. • Conflicting or missing data are poorly addressed.	• Conclusions are clearly and logically drawn from and bounded by the data provided with no gaps in logic. • A reasonable and clear chain of logic from hypothesis to data to conclusions is made. • Conclusions attempt to discuss or explain conflicting or missing data.	• Conclusions are completely justified by data. • Connections between hypothesis, data, and conclusions are comprehensive and persuasive. • Conclusions address and logically refute or explain conflicting data • Synthesis of data in conclusion may generate new insights.