Book Review: Albert C. Hine, Geologic History of Florida,
Major Events that Formed the Sunshine State

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Albert C. Hine wrote this account of Florida's geologic history for a broad audience of teachers "as well as all of those out there who have never lost their desire to learn something new" (p. 4). The text is written in an easy-to-read, conversational tone, and Hine very effectively creates mental images of geologic processes through the use of descriptive text and examples of modern day analogs. In the introduction Hine, who is an oceanographer rather than a geologist, sets the stage for this book by emphasizing the interdisciplinary nature of the Earth sciences and the importance of using an Earth systems approach to put geologic processes into a larger context.

> "The integration of all these processes is now called earth systems science – the next generation of scientists will be known as earth system scientists, rather than merely oceanographers, geologists, and atmosphere scientists. Connectivity is the word du jour, that is, all parts of our planets are intimately linked and affect each other" (pp. 1-2).

In recent years, K-12 Earth science education has increasingly focused on Earth systems science (Hoffman and Barstow, 2007). Thus, by presenting the geologic history of Florida from an Earth systems perspective and using conversational and descriptive text, this book succeeds in providing a broad overview for educators and inquisitive non-scientists.

The text abounds with visuals (over 150 figures in just 229 pages) used to reinforce concepts presented in the text. The figures are generally well done and attractive, making the book very visually appealing. The numerous photographs provide excellent examples of rock outcrops, sediments types and environmental settings. However, many of the book's illustrations were reprinted from more detailed and focused publications with no or only slight modification. Consequently some of the illustrations depict concepts that are not covered in the text. For example, in Chapter 1 – Florida defined, Hine describes Milankovitch cycles as "three major orbital cycles that affect Earth's climate: precession, obliquity, and eccentricity" (p.14). Very appropriately, a figure (Figure 1.5 on p. 15) is included to help the reader visualize these orbital cycles. However, the illustration includes prominent annotations indicating the perihelion, aphelion, and focus; these concepts from astrophysics are not presented anywhere in the text and are inappropriately complex for the general audience for which this text is intended. The inclusion of irrelevant details in this and other figures distracts the reader from visualizing the basic concepts presented in the text.

Although successful in being broad enough for a general audience, there are some sections of text that are so lacking in detail that the reader is at risk of forming an incomplete, if not inaccurate, understanding of Florida's Earth systems. For example, the description of the hydrogeology of Florida in Chapter 7 – Dissolution Tectonics is misleadingly simplified. Hine

appropriately focusses on the Floridan aquifer as "being one of the most productive in the world…extend[ing] from the SE United States to beneath nearly all of Florida" and as supporting "all activity…of tens of millions of people" (pp. 113-114). However, the text does not describe or show the spatial distribution of any other of Florida's aquifers, leaving the impression that the Floridan is the only aquifer of significance throughout the entire state. In fact, because the Floridan aquifer is brackish and quite deep in south Florida, the southern third of the state primarily relies on aquifers other than the Floridan for water supply. Certainly at least the Biscayne aquifer, one of the most transmissive aquifers in the world, which sustains over 800 million gallons of fresh water withdrawals per day (Marella, 2009) as the source of water for more than 4 million people in Florida's southeastern urban corridor should have been mentioned in the summary of Florida's hydrogeology and karst geology.

Additionally, the text inaccurately presents some fundamental hydrogeologic concepts. Of most concern, the text equates "water table" with "surface aquifer" (p. 116) and thereby promotes misunderstanding of the distinction between hydrostratigraphic units (groups of rocks or sediments that yield water to wells) and the water table, which is the upper boundary of the groundwater system. The details of these hydrogeologic concepts might be beyond the scope of a broad general text such as this, but in that case the material should have been altogether omitted rather than presenting incomplete and/or inaccurate information that promotes misconceptions about fundamental concepts.

In summary, the strengths of the Geologic History of Florida, Major Events that Formed the Sunshine State are its conversational tone, its emphasis on Earth systems, and the visual appeal of its colorful illustrations. It is an appropriate text for non-scientists with a casual curiosity about Florida's geologic features. I believe it also could have value as one of multiple Earth Science reference books for K-12 educators. However, because there are places where the text's brevity promotes misconceptions and compromises its accuracy, this book should not be used as a primary reference for anyone with a more than casual interest in Earth systems and/or Florida's geologic history.

References

Hoffman, M. and Barstow, D., 2007. Revolutionizing Earth System Science Education for the 21st Century, Report and Recommendations from a 50-State Analysis of Earth Science Education Standards. TERC Center for Earth and Space Science Education, Cambridge MA.

Marella R., 2009. Water Withdrawals, Use, and Trends in Florida, 2005. USGS Scientific Investigations Report 2009-5125