

Accepted Manuscript

Interplay between dynamic topography and flexure along the U.S. Atlantic passive margin: Insights from landscape evolution modeling

Robert Moucha, Gregory A. Ruetenik



PII: S0921-8181(16)30038-8
DOI: doi: [10.1016/j.gloplacha.2017.01.004](https://doi.org/10.1016/j.gloplacha.2017.01.004)
Reference: GLOBAL 2548
To appear in: *Global and Planetary Change*
Received date: 2 February 2016
Revised date: 11 October 2016
Accepted date: 5 January 2017

Please cite this article as: Robert Moucha, Gregory A. Ruetenik , Interplay between dynamic topography and flexure along the U.S. Atlantic passive margin: Insights from landscape evolution modeling. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Global(2017), doi: [10.1016/j.gloplacha.2017.01.004](https://doi.org/10.1016/j.gloplacha.2017.01.004)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Interplay between dynamic topography and flexure along the U.S. Atlantic passive margin:

Insights from Landscape Evolution Modeling

Robert Moucha and Gregory A. Ruetenik

Department of Earth Sciences, Syracuse University, Syracuse, NY

Abstract

Global backwards-in time models of mantle convection have resulted in vastly different interpretations of the transient state of dynamic topography on the U.S. Atlantic passive margin (Moucha et al., 2008; Spasojević et al., 2008; Rowley et al., 2013; Rovere et al., 2015). However, reconciling these geodynamic models with the observed offshore sedimentary record directly is complex because the sedimentary record integrates changes in climate, sea level, lithology, and tectonics. To circumvent this, we instead focus on modeling the observed deformation of the Orangeburg scarp, a well-documented 3.5 million year old mid-Pliocene shoreline (e.g. Rovere et al., 2015). Herein, we present results from a new landscape evolution model and demonstrate that flexural effects along this margin are comparable to changes in dynamic topography and are required to fully explain deformation of the Orangeburg scarp. Moreover, using the Orangeburg scarp as a datum subject to glacial isostatic adjustment, we demonstrate that a 15 m mid-Pliocene sea level above present-day is most consistent with interspersed coastal plain sediment and surface deformation derived from mantle convection and flexural-isostasy.

1. Introduction

The mid-Pliocene warm period (about 2.9 – 3.3 million years ago) was a crucial interval in Earth's history when atmospheric CO₂ concentrations were 350-450 ppmv (Pagani et al., 2009) (similar to present-day amounts), global temperatures were 1.9–3.6 °C warmer than pre-industrial levels (Dowsett

Download English Version:

<https://daneshyari.com/en/article/5755296>

Download Persian Version:

<https://daneshyari.com/article/5755296>

[Daneshyari.com](https://daneshyari.com)