

## **The Andean Main Range of Central Chile: A Preeminent Archive of South American Mammal Evolution, and its Tectonic and Paleoenvironmental Implications**

John J. Flynn<sup>1</sup>, Reynaldo Charrier<sup>2</sup>, Darin A. Croft<sup>3</sup>, and Andre R. Wyss<sup>4</sup>

<sup>1</sup>Division of Paleontology and Richard Gilder Graduate School, American Museum of Natural History, Central Park West at 79th St., New York, NY, 10024-5192 U.S.A., [jflynn@amnh.org](mailto:jflynn@amnh.org)

<sup>2</sup>Departamento de Geología, Facultad de Ciencias Físicas y Matemáticas, Universidad de Chile and Facultad Ingeniería, Universidad Andrés Bello, Santiago, Chile, [rcharrie@ing.uchile.cl](mailto:rcharrie@ing.uchile.cl)

<sup>3</sup>Department of Anatomy, Case Western Reserve University School of Medicine, 10900 Euclid Ave., Cleveland, OH 44106-4930 U.S.A., [dcroft@case.edu](mailto:dcroft@case.edu)

<sup>4</sup>Department of Earth Sciences, University of California - Santa Barbara, Santa Barbara, CA 93106 U.S.A., [wyss@geol.ucsb.edu](mailto:wyss@geol.ucsb.edu)

The storied record of fossil mammals in South America has been dominated by findings in terrigenous sedimentary deposits in the high latitudes of Argentina. Those strata, generally deposited far east of the ancient and modern Andean arc, have yielded abundant fossils since the mid 19<sup>th</sup> century. By contrast, few of the kinds of deposits that typically produce mammals in Argentina, or elsewhere in the world, occur to the west within the arc itself. Accordingly, the paleontological potential of Chile was largely overlooked until the late 1980s. Reconnaissance in the Andean Main Range near Termas del Flaco first revealed that the Abanico Formation (and correlative units), thick volcanic and volcanoclastic sequences spanning several degrees of latitude, contain locally abundant, often superbly preserved, mammalian remains. Preservation of delicate fossils within these proximal arc deposits, remarkable in itself, also provided startling geochronologic information, and revealed unforeseen tectonic and stratigraphic complexity. These deposits, traditionally considered latest Mesozoic to possibly earliest Paleogene in age, have produced more than twenty mammal faunas that instead span the late Eocene to middle Miocene. Faunistic highlights include *Chilecebus*, the most complete early platyrrhine primate known, and a host of other novel placentals and marsupials. The structural juxtaposition of strata bearing older faunas over those with younger ones unveiled previously unsuspected tectonic intricacies, insights confirmed by subsequent geochronologic work. Cenozoic mammal-bearing strata in the Chilean Andes, now spanning almost 30° of latitude, have already generated remarkable tectonic, chronological and biogeographic advances. Even so, the paleontological richness of these previously neglected rocks has barely been tapped.