Rapid Exhumation of the Sierra Nevada in the Cretaceous Related to Shatsky Conjugate Rise Subduction

Robinson Cecil¹, Jason Saleby¹, Zorka Salebyeva¹, Alan Chapman, Gwaltney Makeavei, Lijun Liu²

¹CALTECH, Pasadena, CA, USA; ²Université Claude Bernard Lyon, Villeurbanne, France

1. INTRODUCTION AND MOTIVATION

The Sierra Nevada batholith (SNB) is the plutonic underpinnings of a long-lived, west-facing mountain range that has undergone a combination of tectonic plate subduction, spreading ridge encounters and large magnitude transform offsets. We focus on the partial subduction of the SNB along the Late Cretaceous southern Shatsky Rise of the Pacific plate. As the subduction zone along the Shatsky Rise was a complex with underplated schists in lower plate position. Note structural map of the southernmost SNB, and adjacent So. California batholith (northern Mojave-Salinia) which form a regional metamorphic core complex with underplated sediments (schists) reflecting rapid exhumation. The large subduction zone that formed over the subducting Shatsky conjugate (Fig. 2). The retrograde path of the underplated sediments (schists) reflect rapid exhumation back out of the shallow subduction zone, leading to the exhumation of a regional metamorphic core complex (Fig. 9). The observation of a regional exhumation event along the western Sierra Nevada batholith is contemporaneous with the subduction of the GV batholiths.

2. WESTERN EXTENT OF THE SIERRA NEVADA BATHOLITH

The SNB is extensively exposed in a broad northern subduction to the south. The broad northern subduction has occurred by a combination of tectonic plate subduction, spreading ridge encounters and large magnitude transform offsets.

3. REGIONAL PATTERNS IN THERMOCHEMISTRY AND BASEMENT EXHUMATION

Regional patterns of mantle anisotropy and sediment exhumation. The high-temperature subduction zones are the main sources of the mantle anisotropy. The mantle anisotropy is a result of large magnitude transform offsets. Rapid exhumation of the Sierra Nevada in the Cretaceous. The SNB is extensively exposed in a broad northern subduction to the south. The broad northern subduction has occurred by a combination of tectonic plate subduction, spreading ridge encounters and large magnitude transform offsets.

4. A PLAUSIBLE TECTONIC DRIVING MECHANISM FOR THE EARLY PHASE EROSIONAL EVENT

The SNB is extensively exposed in a broad northern subduction to the south. The broad northern subduction has occurred by a combination of tectonic plate subduction, spreading ridge encounters and large magnitude transform offsets.

5. REFERENCES