

10-18 ka; about 1 mm/yr in the east and 2 mm/yr in the west. Vertical motion due to faulting and folding on the onshore Oak Ridge fault east of Santa Paula increased from 2.0 mm/yr between 1.8 and 1.0 Ma to 4.5 mm/yr between 1 Ma and the present. Total offshore vertical motion since 1.8 Ma has been at least 2.5 km in the west (Block 231) and 1.4 km in the east (Block 361). Vertical separation of Miocene rocks across the Oak Ridge fault in easternmost Santa Barbara Channel is several kilometers due mainly to fault slip unless there is a non-imaged steep fold limb, while vertical separation for the 1.8 Ma horizon is mainly due to folding. High-resolution seismic reflection data show that the fault slip dies out upwards into folding in the west, and the structure is therefore a high-angle fault-propagation fold or a trishear fold. However, the structural style of the Oak Ridge fault changes dramatically along strike.

## INVESTIGATIONS UNDERTAKEN

### Introduction

The objective of the project is to quantify the amounts, directions, and rates of movements on prominent faults in the region of the offshore Ventura basin, California (Santa Barbara Channel), and the adjoining part of the onshore Ventura basin (Fig.1). The contraction due to folding, which is related to slip on both blind and surface faults, is also quantified. This region is traversed by the same structural trends responsible for the M>7 1812 earthquake, M6.3 1925 Santa Barbara earthquake, the M6.7 1971 San Fernando earthquake and the M6.7 1994 Northridge earthquake. The Oak Ridge fault has been interpreted either as an active fault that cuts to seismogenic depths onshore and offshore (Yeats, 1988; Huftile and Yeats, 1995; Kamerling and Nicholson, 1996), or alternatively as being detached at a few kilometers depth onshore (Suppe and Medwedeff, 1990), and being an active axial surface of a fold, not a fault, offshore (Shaw and Suppe, 1994).

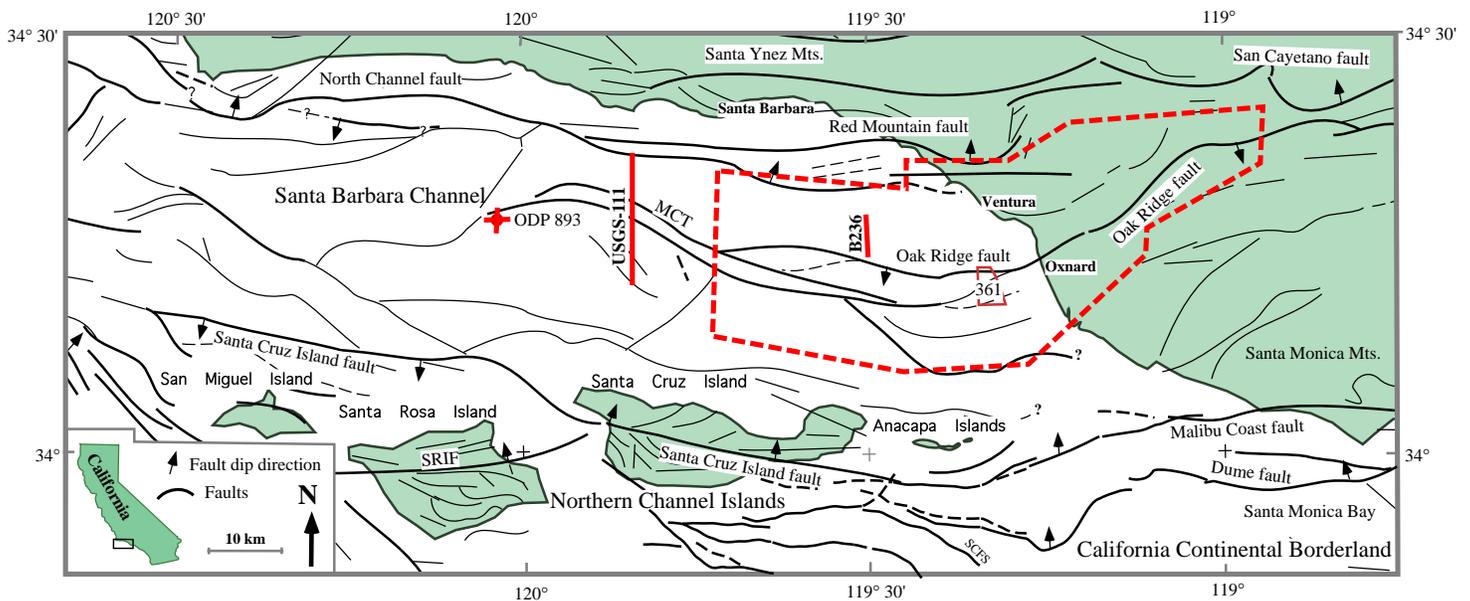


Figure 1: Faults and locations of the western Transverse Ranges. Abbreviations: MCT=Mid Channel trend; SCFS=San Clemente fault system; SCrIF=Santa Cruz Island fault; SRIF=Santa Rosa Island fault. Faults are from Jennings (1994) onshore, and are mapped on the top Monterey Formation (~6 Ma) beneath the Santa Barbara Channel (Sorlien and others, submitted).