Introduction

Glacier Bay National Park, on the Alaska Peninsula, is the southernmost boundary between the North American and the Pacific tectonic plates. A belt of active, east-west striking, right-lateral transform faults separates these plates. Several of these faults have a history of repeated, rapid displacement, each over several kilometer lengths, during major earthquakes. The most recent of these faults to be active was the Fairweather Fault (also known as the Fairweather Seismic Zone), which deforms the Pacific Ocean floor and the adjacent landmasses of southeastern Alaska and southwestern British Columbia. The Fairweather Fault is a major tectonic feature along the Fairweather Range, and relative sea-level change along the Gulf of Alaska coast. Shown here, four enlarged views of the area on the north side of Desolation Valley (fig. B) - Desolation Valley (fig. C) - Desolation Valley (fig. D) - Desolation Valley (fig. E).

The topographic footwall that slopes toward the ocean is separated from the topographic hanging wall that slopes toward the interior by the Fairweather Range escarpment. The footwall is 10,728 ft above sea level (A1), while the hanging wall is 3,270 m (10,668 ft) above sea level (A2). Based on these differences in incision, the higher terraces must be older than the lower terraces if...