OVERVIEW OF NEOGENE WILDCAT GROUP

Excerpt from:
NEOGENE STRATIGRAPHIC EVOLUTION OF NORTHWESTERN CALIFORNIA

K. R. AALTO

The Wildcat Group (Ogle, 1953) constitutes late Miocene through Pleistocene sediment fill within the Eel River basin (Fig. 1). McCrory (1989) argued that the Eel River basin formed rapidly as a stratigraphic basin near the base of an inner trench slope, in response to subduction of the Gorda plate, and that the initial accumulation of sediments occurred at bathyal depths. Wildcat sediments were previously thought to have been derived from chiefly Coast Range sources to the southeast (Nilsen and Clarke, 1987). Moley (1992) and Aalto et al. (1996) instead suggested that basal sediments of the Wildcat Group accumulated at shallow depths as part of a shelf sediment blanket, that the Eel River basin is chiefly a mid-Pleistocene structural basin formed in response to a combination of Gorda – North American plate convergence and the northward migration of the Mendocino triple junction, and that at least some Wildcat Group sediments were derived from the northeast, possibly from Idaho as discussed below.

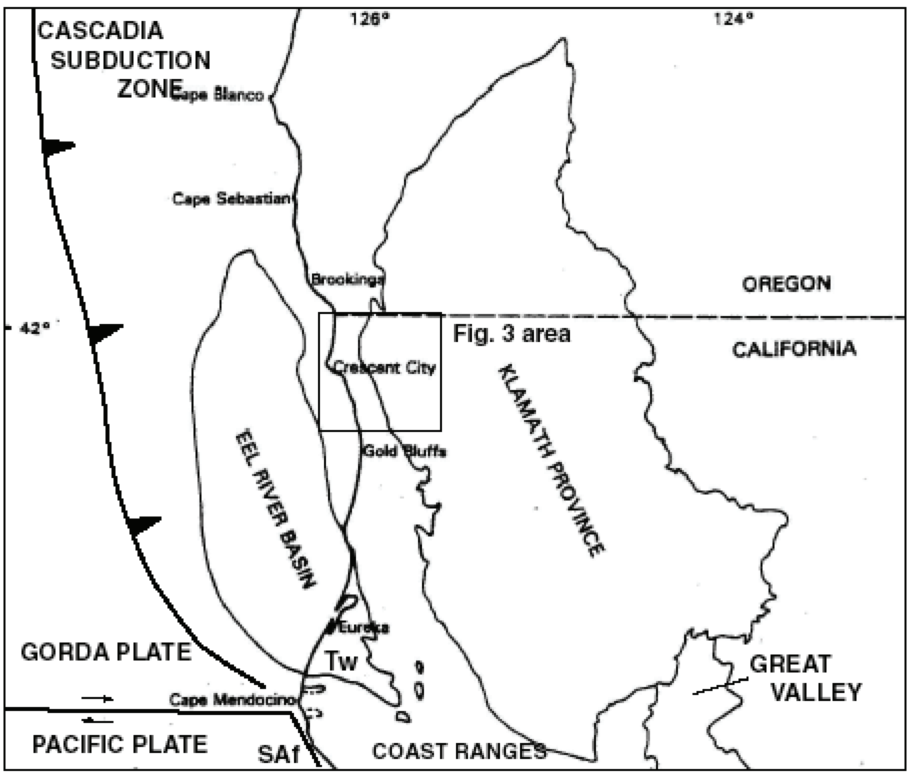

Figure 1. Regional location map showing plate boundaries and general outcrop areas of the Eel River basin, Wildcat Group (Tw), Klamath Mountains and Coast Range provinces, and location of the Mendocino triple junction (at Cape Mendocino). SAF – San Andreas fault.

Overall, the Wildcat Group records an eastward transgression during the late Miocene and Pliocene, with initial deposition of sediments within a near-shore environment, then rapid deepening of the continental shelf to bathyal – abyssal depths, later infilling of the shelf during the Plio-Pleistocene, and westward regression of the shoreline during early to medial Pleistocene (Ogle, 1953; Nilsen and Clarke, 1987; Clarke, 1992; Fig.2). The lowest stratigraphic unit in the Wildcat Group, the Pullen Formation, is believed to be coeval with the Wimer and Saint George Formations.

The marine portion of the Wildcat Group includes 1,900 – 2,600 m of mudstone and subordinate sandstone that range in age from late Miocene to middle Pleistocene, arranged in an overall coarsening-upward sequence (Ogle, 1953; Haller, 1980; Ingle, 1987; Nilsen and Clarke, 1987). At Scotia, inland along the Eel River, and in logging road cuts some 12 km southeast of Scotia, an angular unconformity separates tightly folded Eocene Yager Complex turbidites and tilted, but relatively undeformed, late Miocene Pullen Formation (Moley, 1992; Aalto et al., 1996). Above the unconformity are sandy shoreface deposits that contain locally derived Yager Complex clasts, indicating that a certain amount of erosional stripping occurred in this region during post-Yager, pre-Wildcat time. East of Eureka, on the northeastern flank of the Eel River basin, facies relations suggest that similar unconformities exist (Knudsen, 1993).

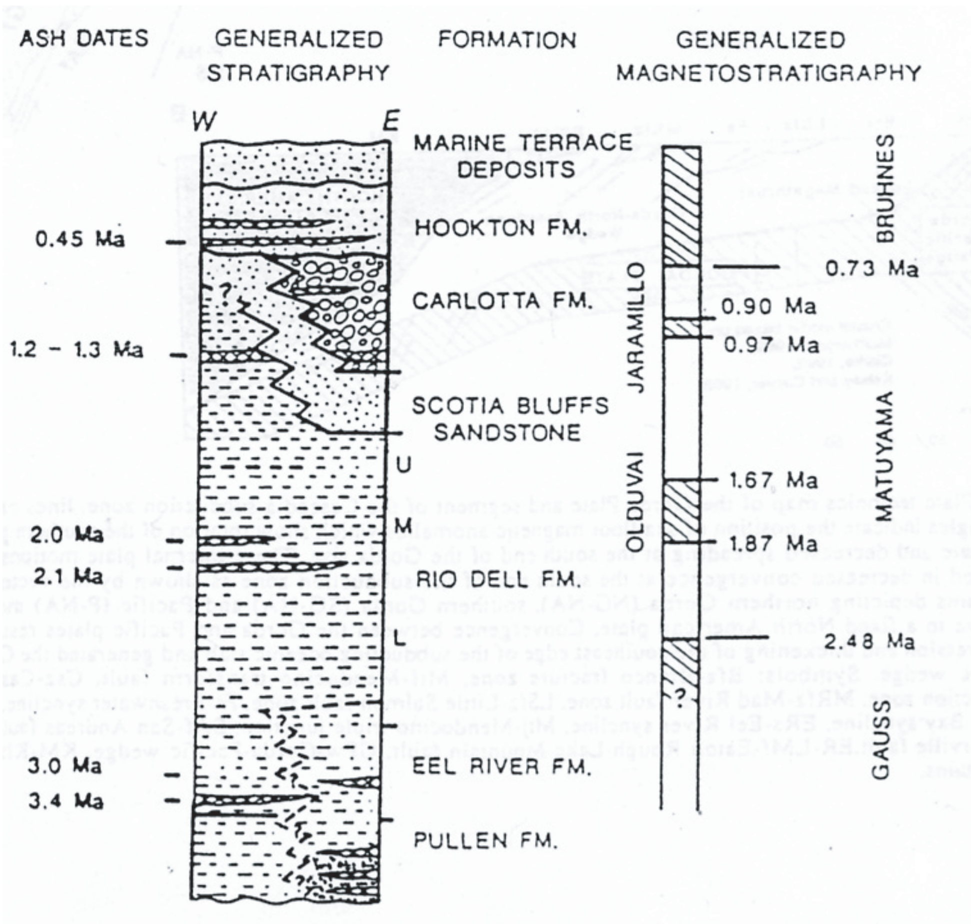

Figure 2. Generalized section of the Miocene to Pleistocene Wildcat Group (Ogle, 1953). Dated volcanic ash deposits, stratigraphy, formations, and magnetostratigraphy are shown.

The nonmarine portion of the Wildcat Group is middle to late Pleistocene and consists of a series of fluvial clastic wedges that thin and intertongue with marine sediments to the west. Thickness ranges from 800 to 1,000 m (Nilsen and Clarke, 1987). Marine – nonmarine cycles are probably glacioeustatic in origin. Patches of similar coeval sediments exist inland of the northeastern flank of the Eel River basin and isolated from basin exposures by basement rock uplifted along active thrust faults.

Moley (1992) determined that Pleistocene fluvial conglomerates of the Wildcat Group were chiefly derived from Franciscan Complex basement of the northern Coast Ranges. However, she noted that late Miocene – early Pleistocene marine sandstones of the Wildcat Group have an unexpectedly high K-feldspar content, given the relative lack of K-feldspar in local basement rocks. Significant K-feldspar content suggests possible sediment input from sources other than the Klamath Mountains or Coast Ranges since these provide comparatively K-feldspar-poor sands (Underwood and Bachman 1986; Aalto 1989b, 1992). $^{40}Ar/^{39}Ar$ laser probe analyses of some micas from Wildcat Group marine sands (Moley, 1992; Aalto et al., 1995, 1998) suggest an Idaho batholith source, which indeed is compatible with the unusually high K-feldspar contents observed.

It seems apparent that Wildcat-equivalent marine and fluvial sediments covered a significant portion of the northern Coast Ranges, but have been removed by erosional stripping in conjunction with active tectonism.

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