INTRODUCTION

This preliminary compilation of the west half of the Vancouver Washington-Oregon 1° x 2° sheet was undertaken by the U.S.Geological Survey, Oregon State University and the Oregon Department of Geology and Mineral Industries for three reasons: 1) to summarize the present state of geologic mapping in the Tillamook Highlands since the publication of the last regional geologic map to include the area (Wells and Peck, 1961); 2) to clarify the regional structural and stratigraphic relations between Tertiary volcanic and sedimentary sequences in the Tillamook uplift; and 3) to define problem areas and act as a guide to further geologic investigations. We wish to emphasize the preliminary nature of this map. It is based on 1:24,000-scale maps of the U.S.Geological Survey (U.S.G.S.), unpublished graphic thesis maps, and unpublished field investigations by the U.S.G.S. The authors have field checked several areas where geologic conflicts exist between different sources of data. However, a number of problems remain to be solved concerning stratigraphic correlations and structural interpretations in the area. It is anticipated that detailed geologic investigations currently in progress by the authors will provide solutions to many of the problem areas.

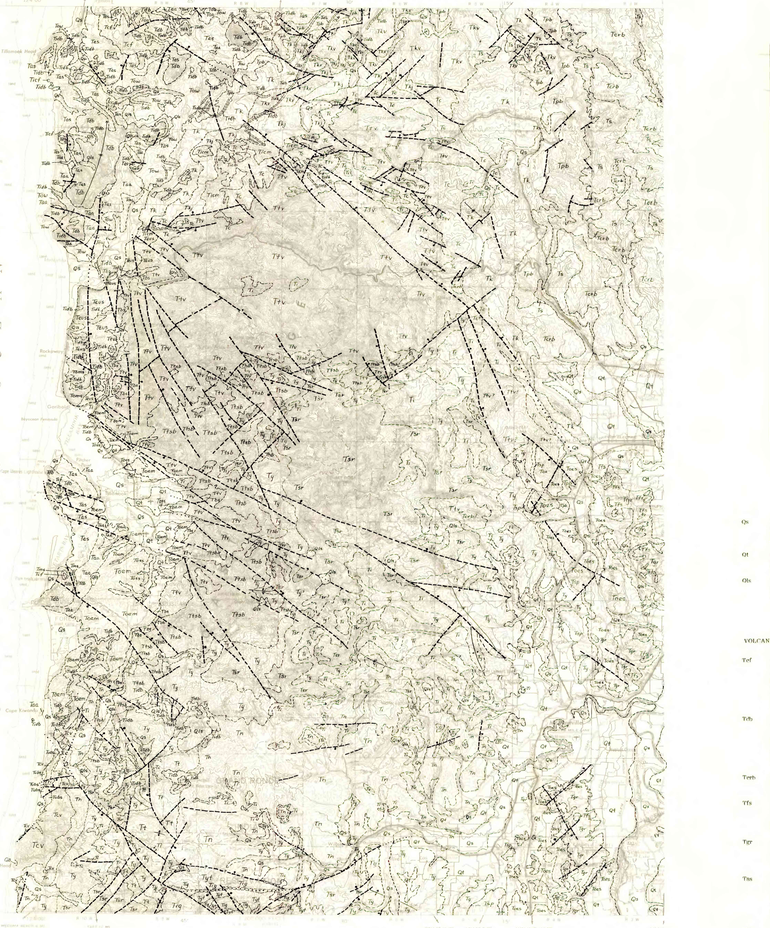
The geologic structure in the map area is dominated by a broad north-northeast-trending structural arch coincident with the Coast Range gravity high (Thompson and Snavely, 1964) that plunges gently northeast beneath the Columbia River. Superimposed on this arch are northeast- and northwest-trending faults. Vertical separation on the faults is shown on the map where known, but the abundance of subhorizontal slickensides on many of the faults suggests that strike-slip faulting may also be important. Exposed in the core of the uplift are lower to middle Eocene altered submarine and subaerial tholeiitic basalts of the Siletz River Volcanics (Snavely and others, 1970) and sedimentary and volcaniclastic equivalents to the continental crust in the middle Eocene (Snavely and others, 1980). This older volcanic sequence is separated from the upper middle to upper Eocene Tillamook Volcanics by middle Eocene deep-water marine siltstone and turbidite sandstone of the lower Yamhill and the Tyee formations, respectively. Both submarine and subaerial facies of the predominantly basaltic Tillamook Volcanics are present, and they attain their greatest thickness on the northwestern flank of the uplift. To the southeast, the volcanics must have thinned greatly across the axis, only scattered submarine basalts near the Yamhill-Nestucca contact are found in the southeast part of the map area.

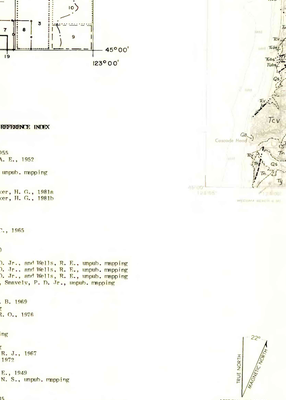
Overlying and flanking the Tillamook and Siletz River volcanic core on the east, north, and west are more than 2,500 m of gently dipping upper Eocene to middle Miocene tuffaceous mudstone and subordinate arkosic and volcanic sandstones and minor conglomerates. These clastic units represent shallow-marine bar, shelf, and deltaic to deeper marine slope and turbidite deposits formed in a forearc basin. Intrusive episodes are represented by upper Eocene and Oligocene basaltic, esmptoritic, and gabbroic rocks and middle Miocene basalts. Subaerial middle Miocene Columbia River Basalts cap the Tertiary sequence on the east flank of the uplift and are represented on the west flank by their coastal equivalents, the Depoe Bay and Cape Foulweather basalts. Several unconformities and basaltic conglomerates in the thick marine sequence reflect deformational events and short periods of emergence separated by longer periods of submergence and continuous marine sedimentation. Major uplift and deformation of the present arch began in late middle Miocene and was coincident with a regional episode of deformation in the Coast Ranges of Oregon and Washington (Snavely and others, 1980; Niem and Niem, in press).

Stratigraphic relationships for the late Eocene to Miocene marine sedimentary sequence that overlies the Tillamook Volcanics have been compiled from a variety of sources (see index to mapping). Although different mapping strategies and facies changes prevent direct correlation of sedimentary units throughout the map area, there is a first order coherence to the regional stratigraphy as shown in the correlation of rock units.

However, there are significant stratigraphic problems on the Vancouver sheet (and elsewhere in the Pacific Northwest), in part because many of the earlier named formations have been mapped and extended far from their type areas on the basis of biostratigraphy rather on lithostratigraphy (Moore, 1963). Hence, some units contain new and distinctly different facies from those present in the type section. This lack of definition has resulted in confusion in the literature and on geologic maps as to the names of units and their distribution. For example, there is some disagreement over the correlation and distribution of the Yamhill Formation. First defined by Baldwin and others in 1955, the lower Yamhill mudstone (Illatian) is, in part, a lateral facies of the turbidites of the lower to middle Eocene (Clallamian) Tyee Formation (MacLeod, 1969; Snavely and others, 1980; Rau, 1974). The lower Yamhill, then defined, lies between the Siletz River Volcanics and the Tillamook Volcanics (Snavely and others, 1970). On the type land, McWilliams (1971, 1974) contends, based on foraminiferal studies, that the type Yamhill is entirely a middle-upper Eocene (Narizian) unit that unconformably overlies the Tyee Formation. Schlicker and Deacon (1967) and Al-Azzaby (1980) report upper Eocene (Narizian) mudstone overlying the Tillamook Volcanics north east of the type area as the Yamhill Formation.

In contrast to the Yamhill Formation, other stratigraphic units may be traceable over larger areas than presently mapped; for example, the basaltic sandstones overlying the Tillamook Volcanics on the west flank of the uplift comprise part of the basal Cowlitz Formation to the northeast and may be mappable over much of the map area. Additional detailed mapping and better definition of undifferentiated stratigraphic units will solve many of the correlation problems apparent from the present compilation.

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