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TRANSPRESSIONAL TECTONIC SETTING OF THE LATEST JURASSIC SIERRAN ARC, CALIFORNIA

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The East Sierran Thrust System (ESTS) emplaces Middle and Late Jurassic plutonic rocks of the Sierra Nevada batholith over coeval volcanic rock in section with the Paleozoic metasedimentary and Precambrian crystalline basement rocks of North America. The ESTS north of the Garlock fault is at least 150 km long. It is divided into several segments with multiple parallel structures that trend NNW with faults and folds directed to the NE. The southern continuation of the ESTS in the Mojave Desert south of the Garlock fault changes orientation to S and SW with E to SE-directed shortening where dominantly the Late Jurassic magmatism are recorded. Middle to Late Jurassic igneous rocks in the system can be described as bimodal because mafic and felsic compositions dominate. Field observations and geochronology data show a close relationship between the ESTS and Jurassic magmatism. Deformation in the ESTS is interpreted to be synmagmatic and episodically activated during the Jurassic arc and waning after the latest magmatism of this time.

Areas of the strongest Late Jurassic contractional deformation are localized in the Slate Range north of the Garlock fault and the Cronese Hills and Iron Mountain areas in the Mojave Desert. Deformed rocks are dominantly silicic in composition and record syn-contractional deformation. Ages from U-Pb zircon geochronology for deformed rocks in the Slate Range are 149.23±0.91 and 148.80 ± 0.14 Ma for alaskite, and 150.99 ± 0.11 Ma and 152.96 ± 0.44 Ma for silicic volcanic rocks and ash-flow tuff. The syn-contractional deformation in Cronese Hills is recorded by 150.73 ± 0.28 Ma felsite intrusive rocks and 150.33 ± 0.04 Ma silicic volcanic rocks of dacite and tuff. Late Jurassic mafic rocks are manifested as diabasic dikes (150.91 ± 0.07 Ma) of the Independence dike swarm (IDS) and undeformed and small, isolated gabbro and diorite plutons. The IDS contain synkinematic sinistral strike-slip fabric deformation. The coexist of the contractional and sinistral strike-slip deformation in the Latest Jurassic magmatic rocks proposes a transpressional tectonic setting in this time that triggered by rapid changes in plate movements.