Featuring EarthScope Science for K-12 Teachers and Students in the Pacific Northwest

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Teachers on the Leading Edge (TOTLE) is an Earth science teacher professional development program featuring EarthScope science and Pacific Northwest geologic hazards. During summers of 2008 to 2010, TOTLE offered a six-day workshop for 35 Pacific Northwest K-12 teachers and 5 community college area team leaders each year. Workshop participants learned how geoscientists developed our current understanding of Pacific Northwest earthquakes, tsunamis, volcanoes and associated hazards and how EarthScope research is advancing frontiers of geoscience knowledge. This cutting-edge science content learning was blended with pedagogical sessions led by award-winning K-12 Master Teachers of Earth science. Workshop participants’ confidence on content topics increased on a 4-point scale (1 = “not at all confident”; 4 = “very confident”) from 2.7 to 3.2 to 3.7 on pre, immediately-post, and 8-month follow up surveys, respectively. TOTLE lesson plans feature analyses of EarthScope observations that apply directly to regional plate tectonics and geologic hazards and align well with national and state science education standards. Many lesson plans are regional adaptations of teaching resources developed by IRIS and UNAVCO. A key feature was developing lesson plans that progress from a basic one-class-period lesson (e.g. “Gum Drop GPS”) to an intermediate-level enhancement (e.g. “Cascadia Locked and Loading”) to a more advanced enhancement (e.g. “Episodic Tremor and Slip”). To facilitate transfer of TOTLE–EarthScope workshop learning to classroom teaching, participants received an extensive collection of maps, posters, and experimental apparatus along with a digital-resource DVD of lesson plans, animations, video lectures, and PowerPoint presentations. Greater than 75% of participating teachers implemented at least six of the curricular elements in the school year following their TOTLE–EarthScope workshop.