

## **SEISMIC STRONG MOTION ARRAY PROJECT (SSMAP) TO RECORD FUTURE LARGE EARTHQUAKES IN THE NICOYA PENINSULA AREA, COSTA RICA**

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The seismic strong motion array project (SSMAP) for the Nicoya Peninsula in northwestern Costa Rica is composed of 10 – 13 sites including Geotech A900/A800 accelerographs (three-component), Ref-Teks (three-component velocity), and Kinematic Episensors. The main objectives of the array are to: 1) record and locate strong subduction zone mainshocks [and foreshocks, “early aftershocks”, and preshocks] in Nicoya Peninsula, at the entrance of the Nicoya Gulf, and in the Papagayo Gulf regions of Costa Rica, and 2) record and locate any moderate to strong upper plate earthquakes triggered by a large subduction zone earthquake in the above regions. Our digital accelerograph array has been deployed as part of our ongoing research on large earthquakes in conjunction with the Earthquake and Volcano Observatory (OVSICORI) at the Universidad Nacional in Costa Rica. The country wide seismographic network has been operating continuously since the 1980's, with the first earthquake bulletin published more than 20 years ago, in 1984. The recording of seismicity and strong motion data for large earthquakes along the Middle America Trench (MAT) has been a major research project priority over these years, and this network spans nearly half the time of a “repeat cycle” (~ 50 years) for large ( $M_s \sim 7.5-7\frac{3}{4}$ ) earthquakes beneath the Nicoya Peninsula, with the last event in 1950. Our long time co-collaborators include the seismology group OVSICORI, with coordination for this project by Dr. Ronnie Quintero and Mr. Juan Segura. The major goal of our project is to contribute unique scientific information pertaining to a large subduction zone earthquake and its related seismic activity when the next large earthquake occurs in Nicoya. We are now collecting a database of strong motion records for moderate sized events to document this last stage prior to the next large earthquake. A recent event (08/18/06;  $M=4.3$ ) located 20 km northwest of Samara was recorded by two stations (Playa Carrillo and Nicoya) at distances of 25-30 km with maximum acceleration of 0.2g.

[Cordilleran Section - 103rd Annual Meeting \(4–6 May 2007\)](#)

[General Information for this Meeting](#)

**Session No. 31--Booth# 20**

[Council on Undergraduate Research \(Posters\)](#)

**WWU–Wade King Center: WKC127**

**8:00 AM-6:00 PM, Sunday, 6 May 2007**

The largest earthquakes nucleate and propagate at intermediate depths along the megathrust interface. Frictional conditions that control the accumulation of strain across the interface can vary along-dip and along-strike, due to increasing pressure and temperature, contact roughness, presence of soft sediments and fluids at the plate interface, and a number of other physical parameters. In order to characterize these interfaces, GPS has been used to record deformation associated with locked plate boundaries. A map of the seismic network at the Nicoya Peninsula, Costa Rica, and evidence of shallow tremor and a slow slip event in August 2008. Contours are modeled displacement during the slow slip event [ Jiang , 2012 ], where the contour interval is 5 mm. Booth #2 " Seismic Strong Motion Array Project (SSMAP) to Record Future Large Earthquakes in the Nicoya Peninsula Area, Costa Rica " Lafromboise, E., Simla, G., McNally, K., and Quintero, R. Booth #3 " Super-High Resolution Seismic-Reflection-. Based Analysis of the Late Pleistocene-Holocene Highstand, Active Newport Channel and Its. A seismic array is defined as a set of seismic sensors, with the same response functions, recording time synchronized and deployed in a homogeneous area according to a certain configuration, with the aim of obtaining a coherent spatial sampling of the seismic wavefield in time. From the analysis point of view, what defines an array is the collective waveform processing. The arrays for global studies will have dimensions in the km range while arrays for small local earthquakes can be in the order of a few hundred meters. It is important that the arrays do not have a spatially periodic geometry to avoid spatial aliasing (for an incoming wave there is then two or more equally good solutions for apparent velocity and azimuth). The Nicoya Peninsula in Costa Rica is one of the few places on Earth where the seismically active plate interface of a subduction zone is directly overlaid by land rather than ocean. At this plate interface, large megathrust earthquakes with magnitudes greater than 7 occur approximately every 50 years. Inter-plate coupling in the Nicoya Peninsula, Costa Rica, as deduced from a trans-peninsula GPS experiment. Earth Planet. Sci. Repeating earthquakes record fault weakening and healing in areas of megathrust postseismic slip. E. J. Chaves. , S. Y. Schwartz. The seismic strong motion array project (SSMAP) for the Nicoya Peninsula in northwestern Costa Rica is composed of 10 - 13 sites including Geotech A900/A800 accelerographs (three-component), Ref-Teks (three- component velocity), and Kinematic Episensors. The main objectives of the array are to: 1) record and locate strong subduction zone mainshocks [and foreshocks, "early aftershocks", and ... After the 1999 Quepos earthquake (Mw=6.9) in the subduction zone offshore Costa Rica, small magnitude earthquakes were located using a local onshore-offshore temporary seismic network, providing a data set of high-quality aftershock locations.