

Dinkelman, M. G., Granath, J. W., Chris, J. M., Emmet, P. A., and Bird, D. E., 2010, **Full 40 km crustal reflection seismic datasets in several Indonesian basins** (abstract): Eos, Transactions, American Geophysical Union, Fall Meeting Supplement, v. 91, T11C-1097.

Long offset, deep penetration regional 2D seismic data sets have been acquired since 2002 by GX Technology in a number of regions worldwide (www.iongeo.com/Data_Libraries/Spans/). Typical surveys consist of 10+ lines located to image specific critical aspects of basin structure. Early surveys were processed to 20 km, but more recent ones have extended to 40-45 km from 16 sec records. Pre-stack time migration is followed by pre-stack depth migration using gravity and in some cases magnetic modeling to constrain the velocity structure. We illustrate several cases in the SE Asian and Australasian area. In NatunaSPAN™ two generations of inversion can be distinguished, one involving Paleogene faults with Neogene inversion and one involving strike slip-related uplift in the West Natuna Basin. Crustal structure in the very deep Neogene East Natuna Basin has also been imaged. The JavaSPAN™ program traced Paleogene sediments onto oceanic crust of the Flores Sea, thus equating back arc spreading there to the widespread Eocene extension. It also imaged basement in the Makassar Strait beneath as much as 6 km of Cenozoic sedimentary rocks that accumulated Eocene rift basins (the North and South Makassar basins) on the edge of Sundaland, the core of SE Asia. The basement is seismically layered: a noisy upper crust overlies a prominent 10 km thick transparent zone, the base of which marks another change to slightly noisier reflectivity. Eocene normal faults responsible for the opening of extensional basins root in the top of the transparent layer which may be Moho or a brittle-ductile transition within the extended continental crust. Of particular significance is the first image of thick Precambrian basins comprising the bulk of continental crust under the Arafura Sea in the ArafuraSPAN™ program. Four lines some 1200 km long located between Australia and New Guinea on the Arafura platform image a thin Phanerozoic section overlying a striking Precambrian basement composed of sedimentary and burial metamorphosed sedimentary rock that we divide into two packages on the basis of seismic character. The upper is 8-15 km of undeformed late Precambrian sediments the top of which ties Eocambrian rocks in wells in offshore New Guinea. This package appears to correlate to the Wessel Group in northern Australia. The lower package is composed of 10-15 km of strongly bedded, presumably burial metamorphosed rocks that make up the bulk of the lower crust. These may equate to any of a number of northern Australian Mesoproterozoic basins. This lower package offlaps 'pods' of seismically transparent basement (?Paleoproterozoic or Archean) that make up at most the lowermost 15 km of the 40 km PSDM line. Both Precambrian packages appear to be craton-margin sedimentary wedges, the younger overlapping the older. The SE extent of the lowermost package is deformed in a thrust system which may mark the event that detached it from its original underlying oceanic or transitional crust during cratonization. The SPAN programs are important new data sets to clarify and in some cases solve outstanding problems in basin architecture and tectonic evolution.