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Coherent Observations

The L-band Gap

A little over a month ago, the Japan Aerospace Exploration Agency (JAXA) announced that a workhorse for the scientific SAR community was in trouble. The ALOS satellite, which carries the PALSAR Synthetic Aperture Radar sensor, had apparently lost all electrical power. After three weeks of trying to wake up the systems on the satellite, JAXA recently announced that it had "decided to complete its operations." After five years of operations, and the collection of over 6.5 million scenes, ALOS, and its unique SAR system, are no more.

This is a blow to the civil and scientific SAR community for several reasons. First, PALSAR was a unique instrument. Its L-band wavelength was about four times longer than any other operating spaceborne SAR system. This provided unique capabilities. While L-band imagery doesn't always look as nice as higher frequency SAR imagery, as we all know in the SAR world, looks are overrated. It's what you can do with the data that counts; and with L-band PALSAR data, you can do a lot. Its ability to maintain interferometric coherence over long periods of time, under variable weather conditions, and even in moderately vegetated areas made this data invaluable to solid earth and environmental scientists around the world. The indefinitely delayed NASA DESDynI mission is an L-band system for these reasons.

Second, PALSAR was a fully polarimetric SAR sensor, one of only two spaceborne SARs with this capability. And again, the L-band wavelength made PALSAR by far the best instrument when it came to studying vegetation using polarimetric techniques, an important tool for environmental scientists.

Finally, and of great importance to Neva Ridge, PALSAR data was affordable. Despite the fact that commercial success was never a key goal of the system, we found PALSAR data to be very useful for a number of applications. And the relatively low cost to obtain data literally made some projects possible.

PALSAR was serving many in the science community. For colleagues at JPL, Stanford, Scripps, Cornell and other academic institutions, an important tool has been lost. PALSAR provided on-going data for earth science applications, and most importantly, contributed greatly to the very rapid analysis of major, and in many cases, disastrous events. The science of fault motion, volcanic evolution, and deforestation; as well as the study of the sometimes cataclysmic events which follow, were all advanced in the past five years due to PALSAR data.

Here in mid-2011, it is not entirely clear when another instrument will be flown that can replace PALSAR. JAXA has plans for a 2013 launch of a more capable ALOS-2 system, and hopefully that will proceed as planned so that there will again be L-band science data available this decade. Other L-band SARs are being developed for launch this decade. However, data policies and the utility of their products to the earth science community are not known. Plans underway in Canada, Europe and elsewhere will lead to other important earth resource monitoring SAR systems, but all at higher frequencies. The fact is that currently there are no useful L-band SAR systems in space, and there probably won't be for a several years. We are now in an L-band gap. Hopefully budget issues in the US will soon be resolved in a manner that will allow for the development and launch of an L-band SAR specifically designed for earth science applications in the near future. But the reality is that such a launch is not likely to occur before the end of this decade.

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