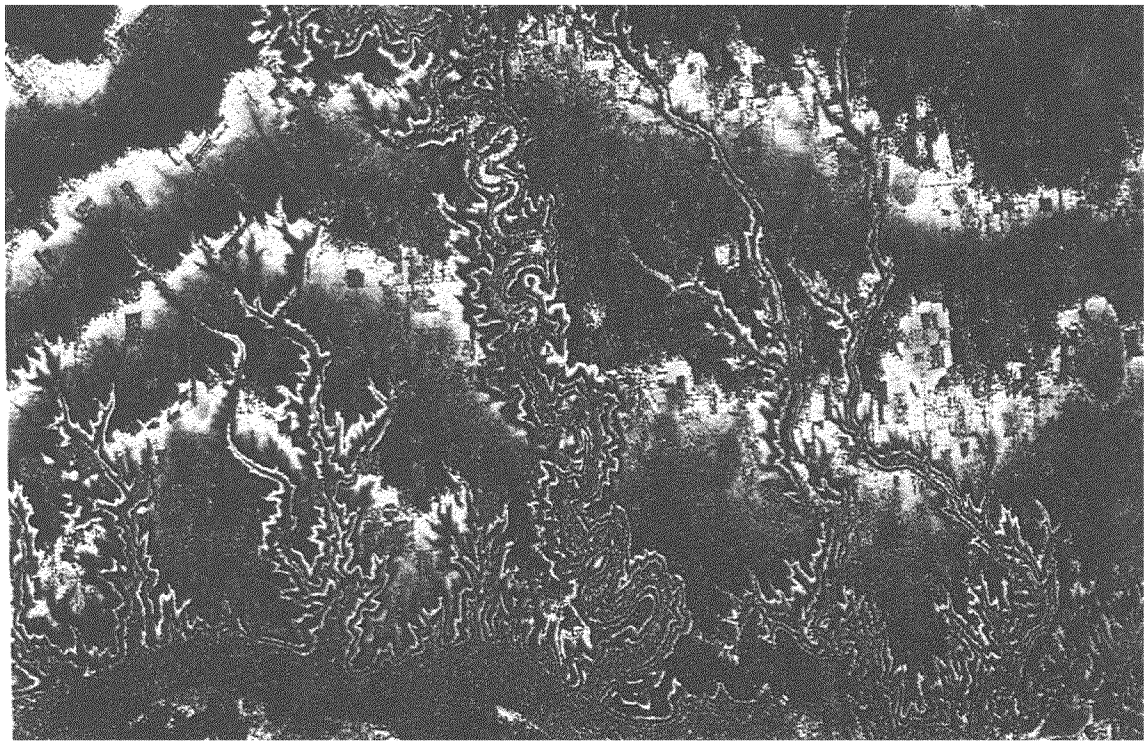

Figure 3 Interferometric fringes due to topography in flat region incised by river valleys.

corresponds to a very high fringes rate indicating a local ground distortion or more than half a wavelength (2.8 centimetres) per pixel (90 metres) The mapping of the displacement field associated within an earthquake gives much more information than the conventional ground stations due to the image density Events with small spatial extension may also be spotted (Massonnet *et al* , 1994). This information will help to improve geophysical modelling of earthquakes The potential of SAR interferometry to forecast earthquakes by remote sensing displacements before an event remains an open question no pair of SAR images, both acquired before a major earthquake, has been processed so far in an interferometric product C.N.E S is working toward this goal

Tectonic faults

Faults may generate surface ruptures during a major earthquake Otherwise, the two sides of the fault may slip very slowly The typical speed is in the order of a centimetre per year Such small displacements are inaccessible to conventional remote sensing techniques but are clearly detected with SAR interferometry (Massonnet et al., 1994) The only requirement is to wait a sufficiently long period of time, one year for instance, to let the slip grow to a measurable size of some millimetres Monitoring of fault creep by SAR interferometry can help to detect potential rupture regions and to model the tectonic behaviour of the ground.

Landslides

Landslides create another kind of ground displacement that SAR interferometry could measure. Unfortunately (for interferometry), landslides present most of the time a small spatial extent which affects only a few pixels on the image. Furthermore, surface changes usually occur due to the small scattering character of the landslide, and therefore jeopardise the coherence. The loss of coherence could however be an indication helping to locate the event and to estimate its extent.

Flooding

Flooding is not concerned with small displacements, but is determined by topography. The capability of SAR interferometry to deliver a DEM can help to identify the areas which might be affected by flooding. On sites with high topographic variations, the accuracy of a DEM derived from interferometric products is comparable to the 10 metres precision of DEMs obtained with stereoscopic techniques and optical sensors like SPOT The altitude of ambiguity has to be great enough (say more than 100 metres) to allow the fringe pattern to be readable in the interferogram. With a smaller altitude of ambiguity, of about 20 metres, DEMs can be created with a one metre precision on areas of smooth topography where the conventional remote sensing techniques operate poorly. Furthermore, the "all weather" capability of