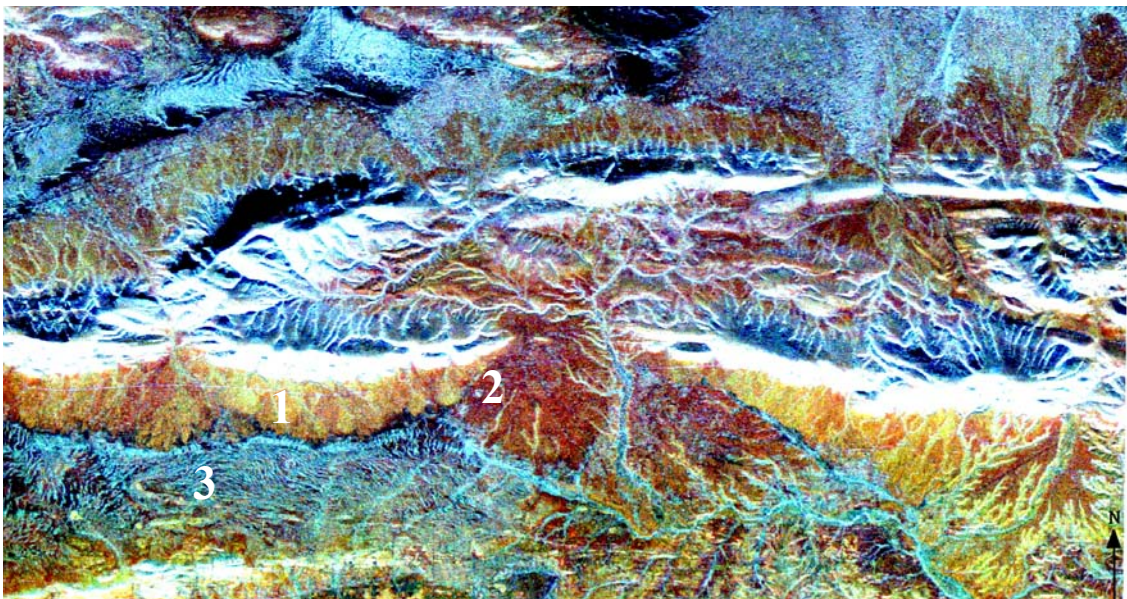


## Terrain analysis

An interpretation of radar images can often permit a fuller comprehension of the morphology of the landforms and the nature of the materials that form those landforms when compared with optical datasets. This interpretation is driven by a relationship between surface morphology and composition of particular landform units. For example, in the Ophthalmia Range region of the Hamersley Basin in Western Australia, a series of landscape evolution processes can be deduced from enhancements of AIRSAR imagery. These processes were active under former climatic regimes and led to the construction of a sequence of palaeo-environmental events to produce the landforms associated with the colluvial and alluvial units. In Figure 3 two broad morphological regimes can be recognized. Extensive bedrock outcrops of the Ophthalmia Range have been, and are still part of, an erosional regime capable of supplying large volumes of material. This material has been transported and deposited in the depositional regime by both colluvial and alluvial processes to form marginal colluvial fans [Location 1], alluvial fans [Location 2] and sheetwash plains [Location 3].

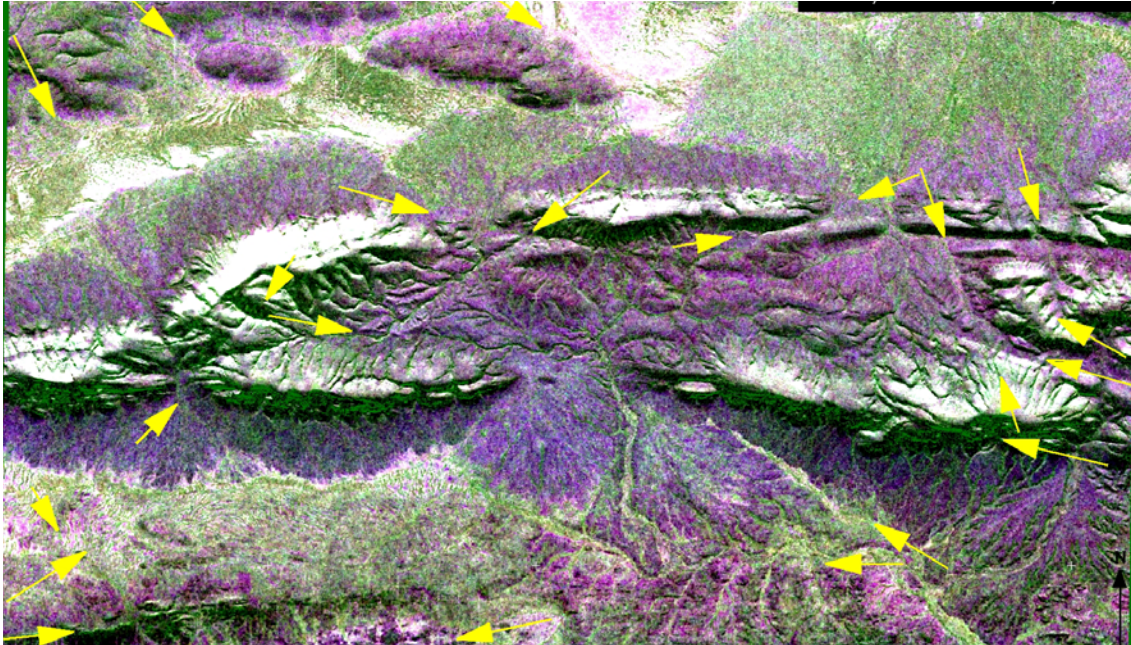


**Figure 3:** Landforms in vicinity of Ophthalmia Range, Hamersley Basin – a composite image of AIRSAR bands Cvv/Lvv/Pvv as RGB. Site dimensions - 16x8 km; north direction to top of image.

The colluvial fans form a series of interconnecting, laterally coalescing, landforms. Each displays a distinctive yellow or red hue depending on the mean grain size and/or angularity of the surface lags, and the cover ratio of lag:soil:vegetation. The “yellow” fans are considered to have formed initially in the piedmont zone at the foot of the strike ridges as debris flows of locally derived coarse materials. The “red” fans are younger debris flows of slurry material formed by landslide action following deposition of the “yellow” fans. These flowed out over the “yellow” fans. During subsequent wet climatic phases, generations of alluvial fans developed as a series of discrete and topographically prominent, alluvial fan lobes over the marginal fans. Creeks since formed have developed as well-formed flow lines

## Geological mapping

The highlighting and shadowing of the terrain by the side-looking illumination of radar is a distinct benefit for mapping geological structures in vegetated and non-vegetated terrains. In areas of prominent outcrop and relief, an image will commonly have a pseudo-3-dimensional perspective that highlights the position of lineaments, fault and fold structures, and morphological characteristics such as dip slopes and slope-asymmetry. For example, an enhancement of AIRSAR data in Figure 5 has provided a new insight into the geologic framework of the Ophthalmia Range region by highlighting several prominent structures within the synform, and linear extensions of these structures within the adjacent valleys.



*An interpretation of prominent linear structures from an enhancement of AIRSAR data of the Ophthalmia Range region. Site dimensions are 16x8 km, north direction to top of image.*