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Airborne LIDAR and magnetic image structural interpretation to assist regional exploration target generation in the Henty Gold Mine area, Tasmania

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Lidar DEM

The Lidar 2m-resolution Digital Elevation Model (DEM) was flown by Fugro in 2011 over Unity's tenements in west Tasmania. This data was supplied as 214 XYZ ASCII grid file 2x2km tiles. These tiles were merged into a single 3D DEM file using MapInfo Discover 3D. The DEM image was coloured and sun shaded from southeast (Figure 1). .

The generated MapInfo DEM files are saved in ***N:\200000 Goldfield and Regional Exploration\200115 Tasmania\Henty_Lidar_Discover_DEM\2m_DEM_ESRI_ASCII***. Double-clicking on ***henty_lidar_tiles.wor*** file will open the data tiles over Henty merged DEM (***Henty_DEM_merged.tab***) in MapInfo. Then click on ***Discover*** tag and select Discover 3D menu. This will open ***Discover 3D*** tag. Click on ***Discover 3D*** tag and select ***Open 3D Window***. In ***Discover 3D*** window select ***File*** – ***Open Session*** and select ***Henty_DEM_Discover3D.egs*** file. Hit ***Open*** to display Henty Lidar DEM in 3D. This may take few moments due to large file size.

Alternatively, double-click on ***Henty_DEM_merged.tab*** file and open the ***Discover 3D*** menu. Then scroll down in ***Discover 3D*** tag and select ***View Surface in 3D*** to open dialog box. Select ***Henty_DEM_merged*** file in this dialog box and hit ***OK*** button. This should open the ***Discover 3D*** window in which a 3D view of the Henty Lidar DEM will appear (Figure 2). To change or adjust the DEM surface colour and appearance, double-click on ***Henty_DEM_merged Surface*** in ***Workspace*** window and select ***Colour***.

Structural interpretation

A brief structural interpretation of the regional-scale aerial magnetic imagery over the southern tenements was carried out using MapInfo (Figure 3). This interpretative line file is saved as ***airmag_interp.TAB*** in ***N:\200000 Goldfield and Regional Exploration\200115 Tasmania\Henty_Lidar_Discover_DEM\Interp***.

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The NE-striking Henty Fault is a dextral shear. The NW-striking faults are sinistral shears conjugate to Henty Fault. This combined rotation is evident in the sigmoid structure deflection along and between these faults. Hence, dilation pockets can occur in triangular zones just south of the intersections between the Henty Fault and its NW-striking splays. The Henty gold deposit occurs in the middle of one such zone, and other similar zones are highlighted (Figures 2-7).

An east deflection of the Henty Fault line visible on Lidar DEM in the central Tullah EL zone could be dilation jog (Figures 2 and 5). Similar fault jog occurs along another fault interpreted 1.5km east of this Henty Fault section.

High-angle magnetic trend discordance along the NW-striking fault which diagonally intersects Tullah EL indicates a vertical component of movement. The vertical movements on other faults are evident in their geomorphic expression on Lidar DEM (Figures 3-5). This is also evident in the juxtaposition of different magnetic image domains, which correspond with the older volcanic units and the younger volcanic clastic lithostratigraphies shown on the government geology map (Figure 3).

A 500m-long southerly extension of the Henty deposit was postulated based on a curvilinear magnetic image low which may coincide with sulphide alteration (Figure 7). This magnetic low diverges eastward of the updip projected surface outline of ore. This suggests that the dip of the deposit changes from a subvertically west-dipping in the zone near and parallel with the Henty Fault, to a steeply east-dipping NW-striking away from the fault. Unless there is clear drillhole and underground data evidence to the contrary, a magnetic susceptibility measurement of the mineralised rocks and geophysical magnetic modelling may be warranted to further investigate this theory.

Drazen Vukovic, 11th April 2011

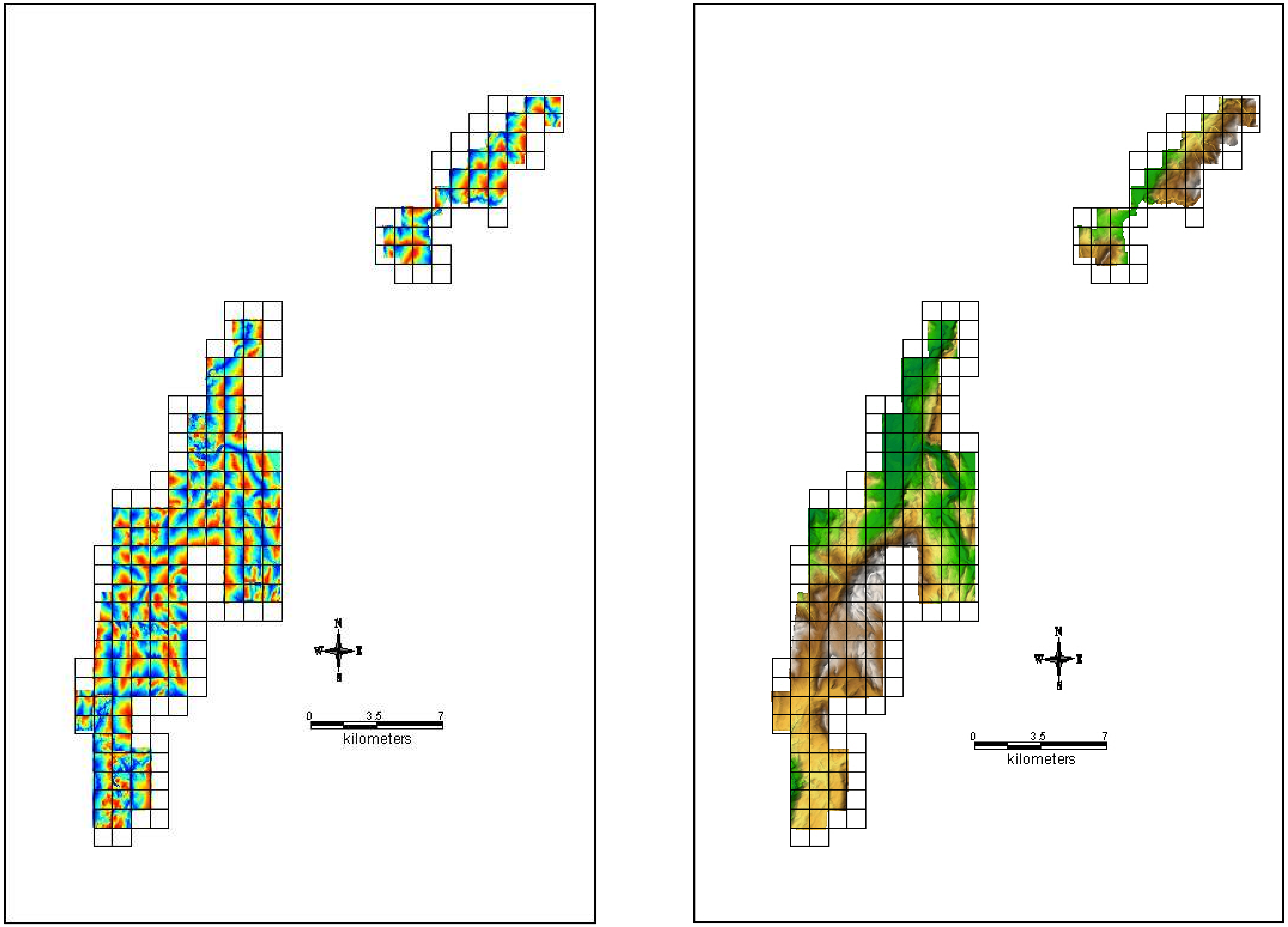

Figure 1: Lidar DEM tiles ‘raw’ (left); and Lidar DEM tiles merged, coloured and shaded (right)

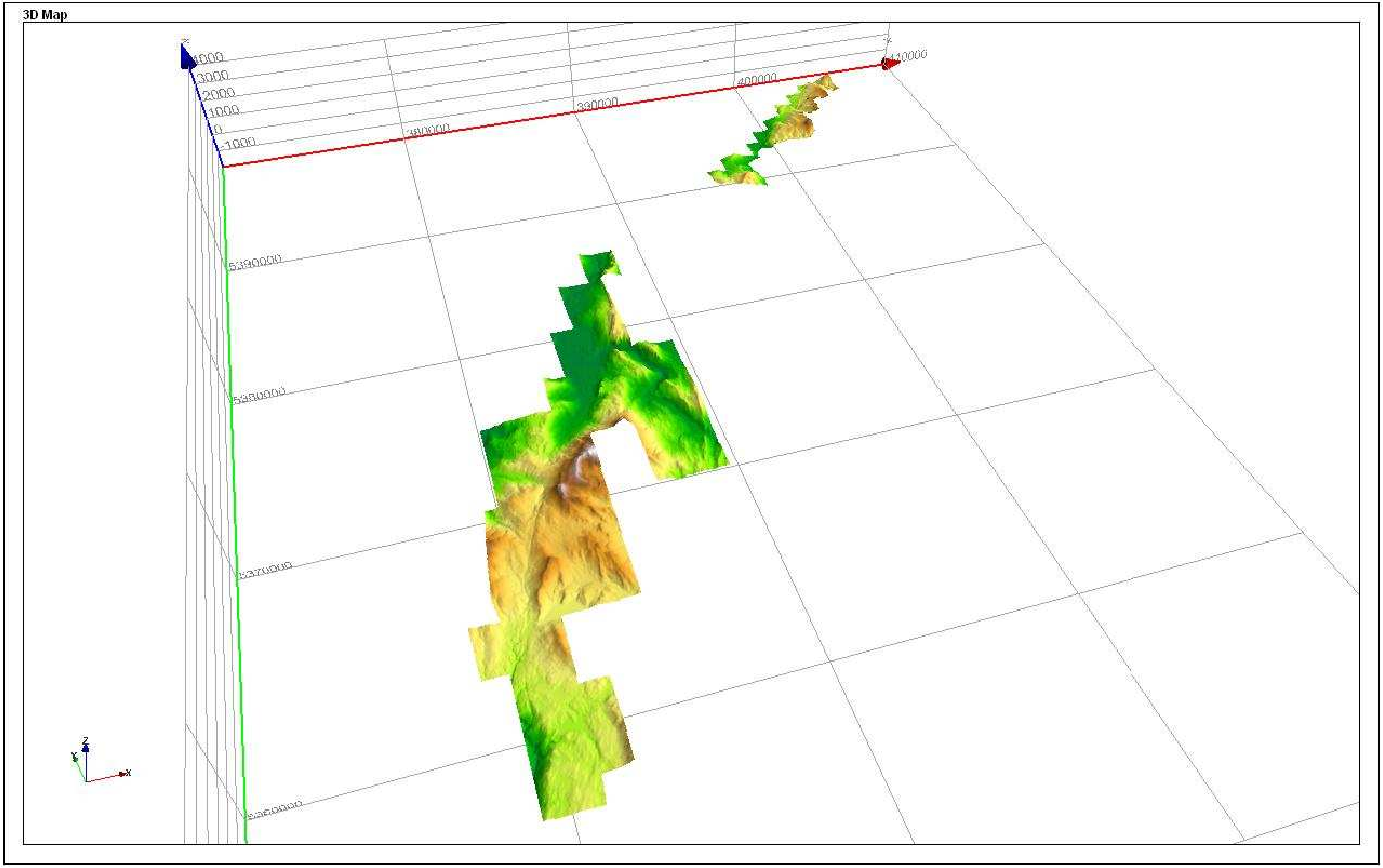

Figure 2: Henty Lidar DEM

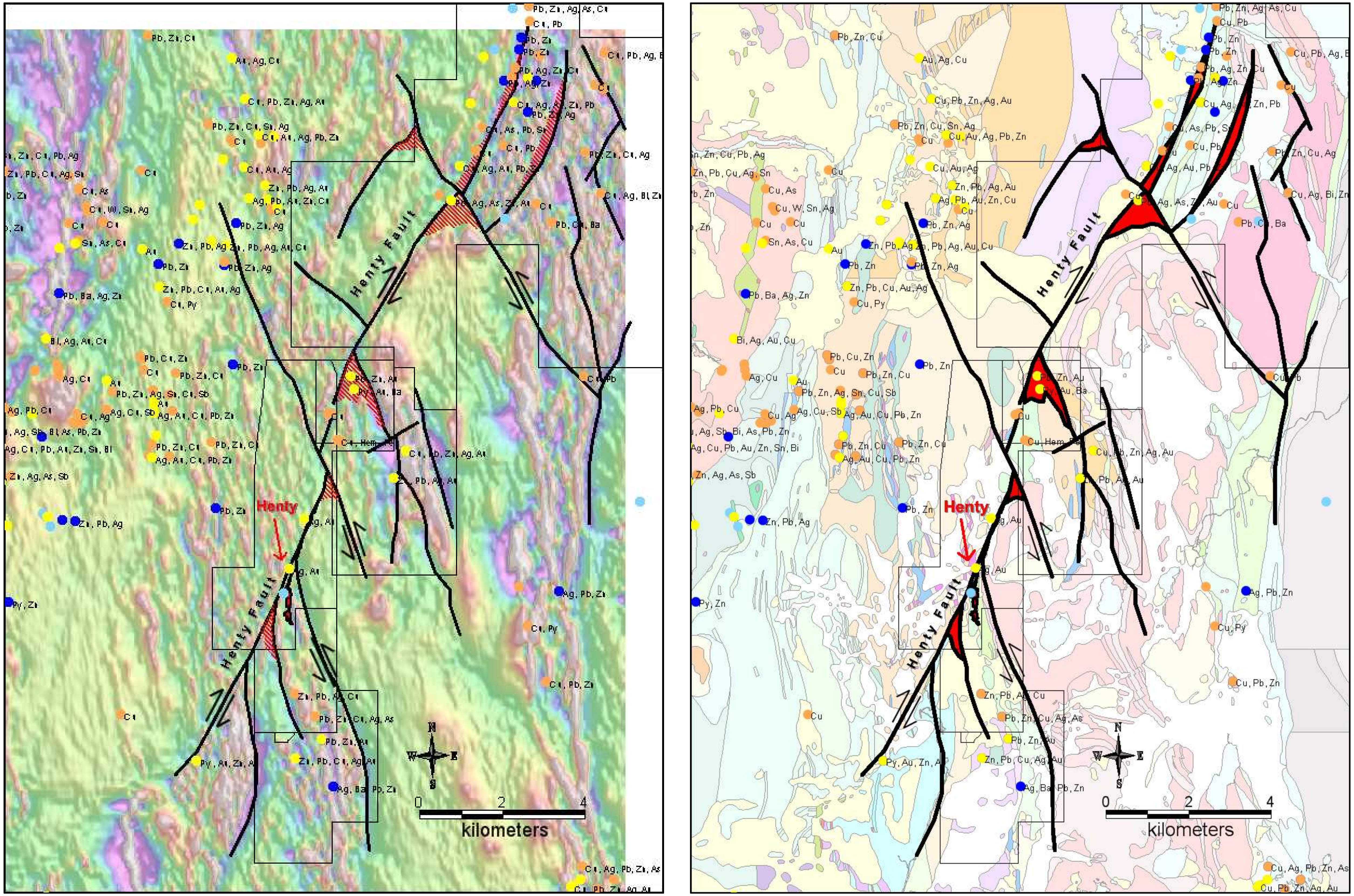

Figure 3: Henty 1VDTMI magnetic image structural interpretation and fault dilation zones (red cross-hatched polygons), government geology and mineral occurrences

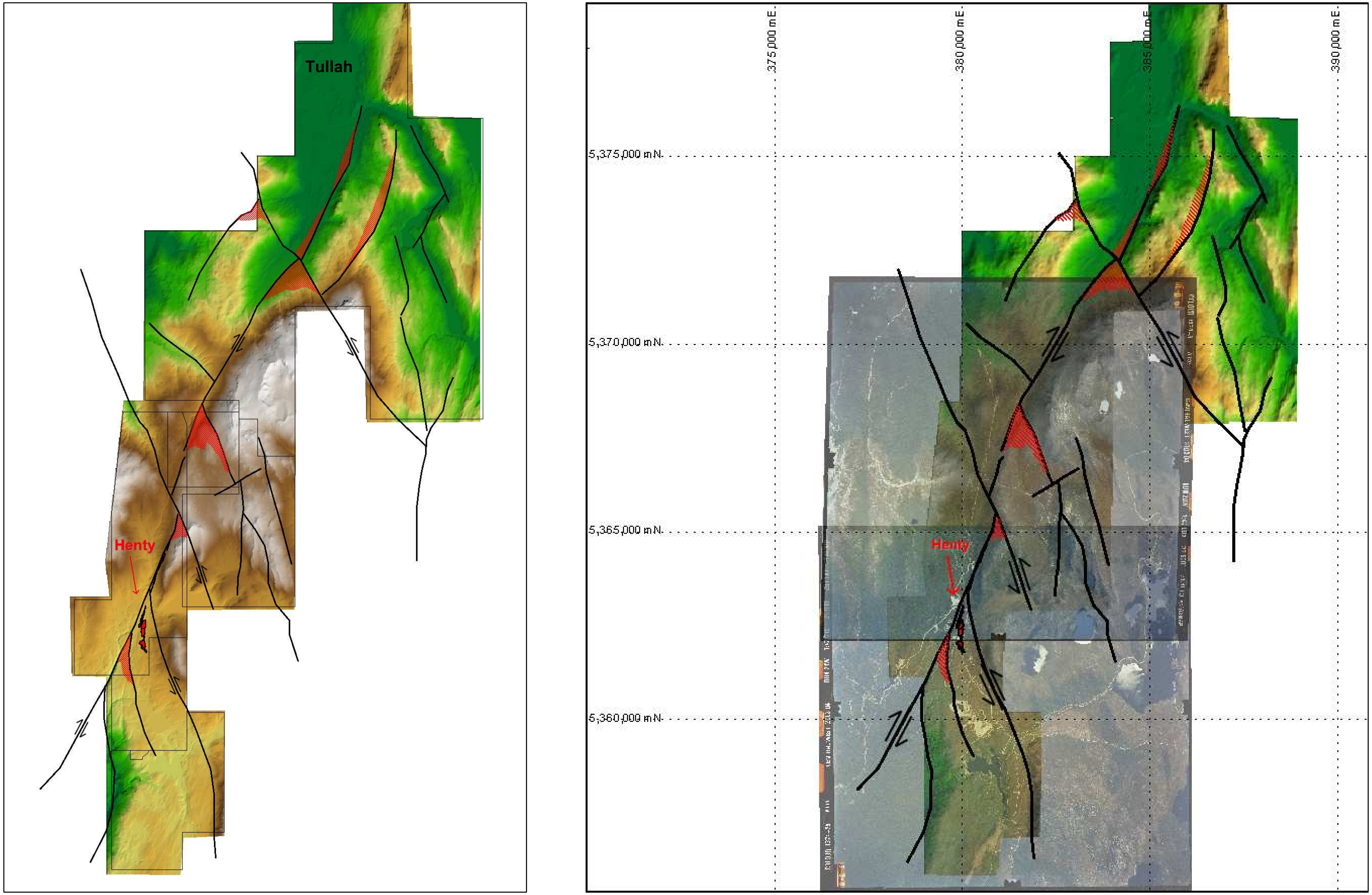

Figure 4: Magnetic image structural interpretation and fault dilation zones (red cross-hatched polygons) on Henty Lidar DEM and aerial photos

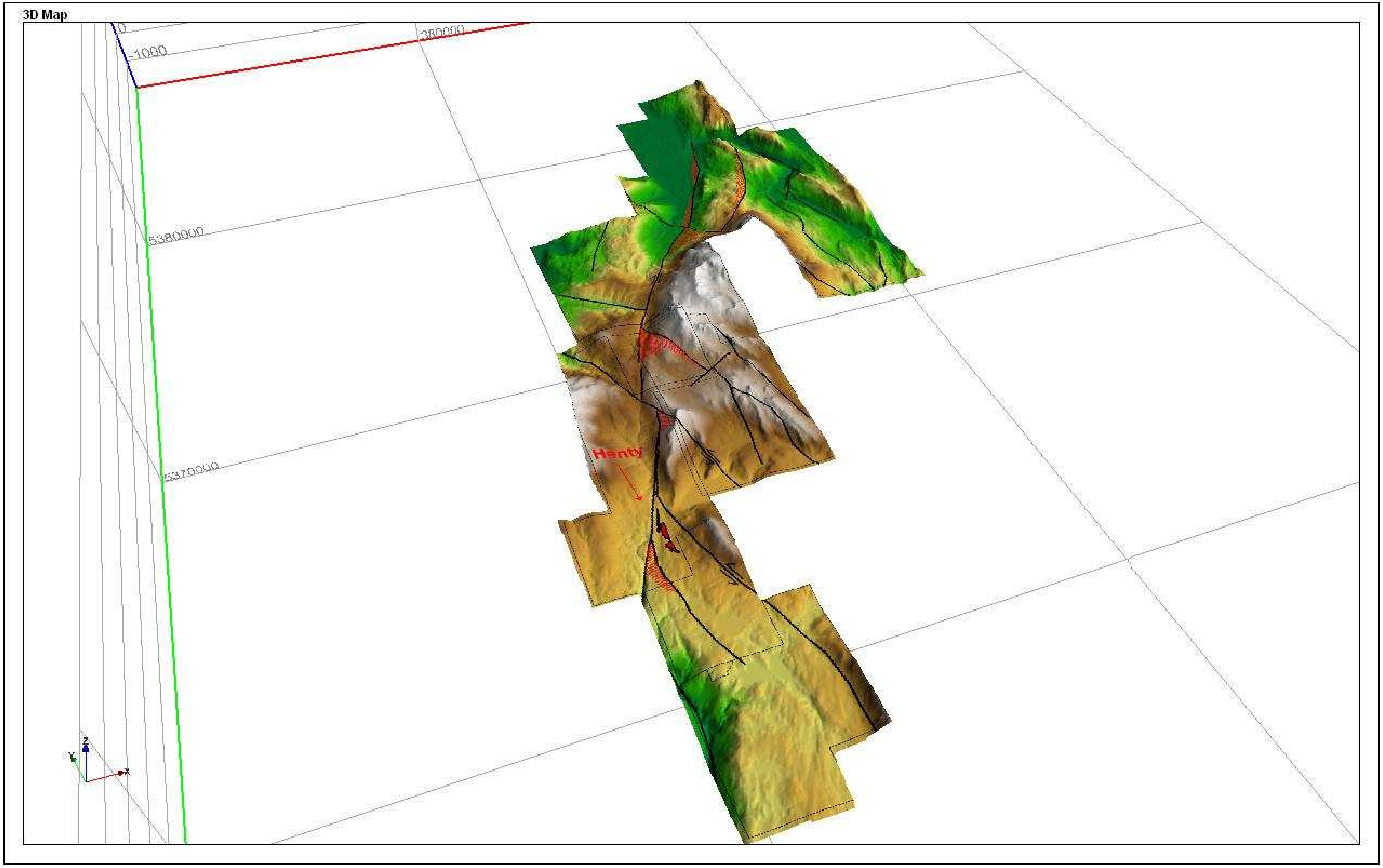

Figure 5: Magnetic image structural interpretation and fault dilation zones (red cross-hatched polygons) over Henty Lidar 3D DEM

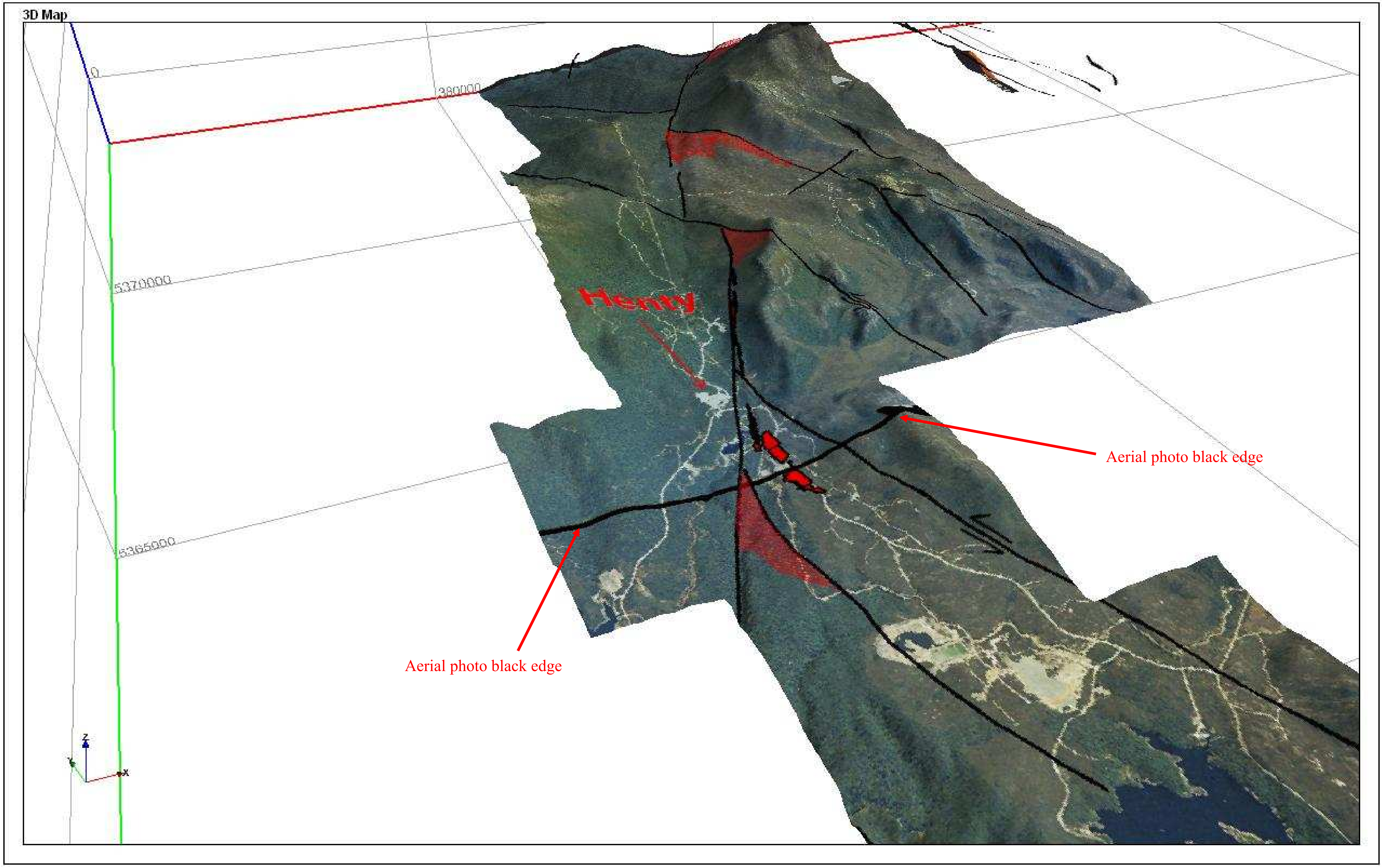

Figure 6: Magnetic image structural interpretation and fault dilation zones (red cross-hatched polygons) on aerial photos draped over Henty Lidar 3D DEM

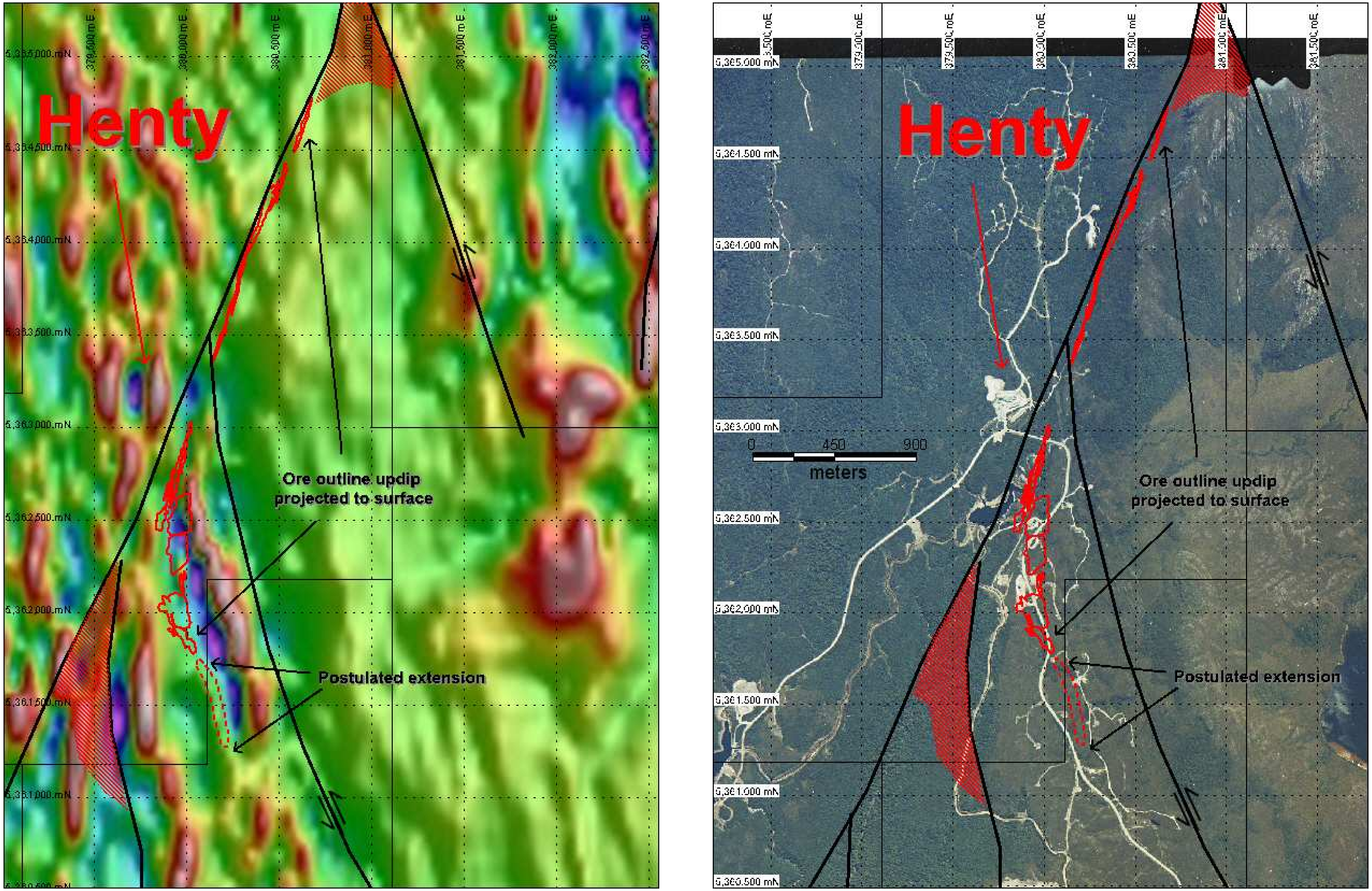

Figure 7: 1VDTMI magnetic image and aerial photo close-up over Henty Mine, structural interpretation, mined and postulated orebody outline projected to surface