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Bondi Mining Ltd: Murphy Uranium Project

Summary of June 2009 Interpretation

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Abstract

This report summarises key results of a re-interpretation of the Bondi Mining Ltd Murphy project which was requested during discussions with R Valenta, Managing Director, Bondi Mining Ltd, on the 7th October, 2008. A start date of early May, 2009 was scheduled, to facilitate immediate deployment of newly-acquired detailed aeromagnetic and radiometric data over the remainder of Murphy Uranium Pty Ltd tenements in the Murphy Project (**Figure 1, 2**). Delays in the acquisition of the new data, however, set the project commencement date back to June, 2009, with its completion in mid-August, 2009. ARC VIEW shape and layer files containing the new interpretation, and new or modified targets resulting from it, are complete, and were forwarded to David Esser and Bondi Mining Ltd on the 27th August 2009. **Figures 1** – **21** illustrate all targets and selected elements of the interpretation, geological setting, and potential field setting.

The interpretation, here augmenting earlier efforts, is the last in a series of three, and it supports but expands inferences made in the two preceding ones. The interpretation was aimed at defining plays for unconformity-style uranium mineralisation, and it significantly modified plays arising in earlier studies, resulting in the definition of 11 successors of the earlier-defined plays and 15 new uranium plays (**Figures 3**, **9**). The discovery that the complex, and generally deformed sheet-like magnetic units near the base of the Westmoreland Conglomerate are predominantly magnetite-bearing mafic sill-dyke complexes required re-definition of the unconformity style mineralisation plays arising from the earlier studies, as the sill-dyke complexes would largely preclude appearance of "normal" unconformity-style mineralisation at or near the base of the Westmoreland Conglomerate as originally targeted. Rather, their occurrence would enhance potential of the Murphy project for Nabarlek-style or Westmoreland-style mineralization. Generation of an internally consistent geological interpretation with robust definition of the full extent of the dyke-sill complexes proved exceedingly difficult in the W and SW sectors of the region because of pervasive cover of Antrim Plateau Basalt (APB) underneath a thin skin of Cainozoic sedimentary rocks, with the result that targets in the SW sector are less well defined than the others, but are of interest for the more conventional style of unconformity associated uranium mineralisation (**Figures 11**-**13**).

Occurrence of extensive mafic dyke-sill complexes displaying variable susceptibilities, emplaced relatively early in the history of an evaporite-containing basin, namely the McArthur Basin where it abuts the Murphy Inlier, necessitated a re-examination of their potential for nickel-copper mineralisation, noting that targets for such mineralisation arose in the first study of the Murphy Project, in May 2008. Eight targets were defined in the current study, although these are all high risk propositions. Potential of the targets is enhanced by the apparently "reduced" nature of meta-sedimentary rocks within the Murphy Inlier (although reduced sulphur content of such rocks is unknown) and the likely presence of abundant evaporite within the Tawallah Group, which comprises the majority of the McArthur Basin infill. However, information on the composition of the mafic dyke-sill complexes in the Murphy Project is not available: it is not known if the dyke sill complexes are composite, contain olivine-phyric rocks, such as olivine gabbro, or are more differentiated rocks, for example tholeiite, with clinopyroxene as a phenocryst phase. Because of this crucial missing data, the targets are high risk propositions, although the best of them clearly warrant exploration evaluation (**Figures 5**, **12**).

Exploration evaluation sequence of the uranium and nickel-copper targets is clearly constrained by location within the Murphy Project area, individual target technical rank order scores, and empirical indications for mineralisation generated in programs so far. Applying these concepts

indicates that evaluation first focuses on the copper-(uranium) mineralisation and alteration defined in UC 19, with the area of most interest in this target likely to be S from MURD 002, with holes drilled from the east into the fault zone where it defines the edge of the mafic intrusive complex here (**Figure 16**, **22-27**). Next in the order are UC38, UC 40, UC28, UC29, UC17, UC41, UC37, UC31, UC23, UC18 and UC6 (**Figures 15**, **16**, **17**, **18**), with the specific order constrained by local geographic and logistical constraints, noting that target technical rank orders will most likely change as knowledge is acquired. Targets UC28, 29, 30 and 35 (**Figures 9**, **13**, **14**), all of interest for the more conventional style of unconformity-associated uranium mineralisation, will likely represent deeply buried opportunities, with consequent need to more rigorously quantify likely depths of prospective rock units through more constrained modelling of the aeromagnetic data prior to drill evaluation (**Figure 13**).

For the nickel-copper targets, an early attempt should be made to collect samples of the inferred dyke sill complexes of interest to see if their composition is permissive for nickel-copper mineralisation. Because of the compositional variability of nickel-copper mineralised dyke sill complexes samples should be obtained close to inferred dyke-sill complex feeder zones, for example, those in BM 9, 14, and 17 (**Figure 15**, **16**, **17**), and possibly from parts of the inferred dyke-sill complex within uranium target UC25 (**Figure 5**). If collection of samples of inferred dyke-sill complexes is not feasible, then a program of “deep-looking” EM is recommended for the better targets, namely BM 9, 14, 16, and 17, although variably thick Phanerozoic and Neoproterozoic cover may present problems, with follow up drill evaluation of individual EM anomalies. If surface sampling and the EM is ineffective, then the four highest priority and shallowest nickel-copper targets should be subjected to one traverse each of RAB or RC drill holes to magnetic anomaly source. In BM 9, Westmoreland Conglomerate covers much of the dyke-sill complex, so the evaluation drilling must be targeted on the highest amplitude magnetic anomalies with shallowest depth to source, and these are on the W and S margins of target BM 9.

Introduction

The two prior interpretations of the Bondi Mining Ltd Murphy Project are described in reports titled “Bondi Mining Ltd: Murphy Uranium Project Summary of October 2008 Interpretation” (Douglas Haynes Discovery Pty Ltd, report BML 02, October, 2008); and “Bondi Mining Ltd: Southern McArthur Basin Unconformity Uranium: New Generation Uranium Targets Work” (Douglas Haynes Discovery Pty Ltd report BUL 01, May, 2008). Both of these interpretations follow on from an interpretation performed for the original tenement holders here, Buffalo Gold Ltd. This early work is described in report titled “Buffalo Gold Ltd: Southern McArthur Basin Unconformity and Base Metals: Summary Conclusions” (Douglas Haynes Discovery Pty Ltd, Report BGL 03, January, 2007).

Work completed in the interpretation and analysis summarised here comprised: (a) extensively reworking the October interpretation, and extending it to the areas covered by the new sets of detailed aeromagnetic and radiometric data; (b) integrating of the interpretation with the Hylogger drill log data and radiometric drill log data in the ARC VIEW environment to facilitate appraisal of work completed in several of the targets; (b) appraisal of drill hole geological data and reclassification of the new drill hole geochemical data and incorporation of it into the ARC VIEW environment; (c) integrating the gravity and magnetic “worms” generated respectively from the Bouguer Gravity and aeromagnetic data sets with the structural interpretation, noting in particular the close association of unconformity associated uranium deposits and Bouguer Gravity "worms"; and (d) redefinition and attributing U and Ni-Cu targets, including extensive modification of all targets generated in the October interpretation.

It is suggested that this summary note be read alongside the ARC VIEW project, titled "BML NT UnconfU 250309" so that the context of the recommendations and observations is clear. A parallel interrogation of the ARC VIEW project is required to better understand the points made in the following recommendations.

Recommendations

(1) It is recommended that exploration of the uranium plays UC 18 (August), 19, 22, 23, 25, and 26 (**Figure 15**, **16**), now focus on the "upper" i.e. the hanging-wall, contacts of the mafic sill-dyke complex, or on the margins of the sills in the hanging-wall of the groups of dyke-sill complexes where they contact the NW or NE-striking short faults, and where they "face" the local Tawallah Group depocentre of the contiguous McArthur Basin: the aim is to target variations on the Nabarlek-style or Westmoreland style of uranium mineralization. It will be difficult to predict in advance where the individual drill targets will be if surface geochemistry techniques are ineffective: locally complex configurations of the dyke-sill complexes, for example, in the central and NW sectors of targets UC19, render conceptual target definition difficult. Some guidance will be provided by the detailed aeromagnetic data, where magnetite-destructive zones within the dyke-sill complexes should characterize alteration or mineralization of interest, particularly if such zones appear associated with faults or joint sets, as in UC18, 19, 22, 25, and 26, for example.

(2) In UC19, follow-up drilling to MURD002 should be to the S of here, with the holes drilled into the fault zone from the east. There seems to be a low-order indication in the U_3O_8 equivalent anomalies, in illite-crystallinity, and in the drill-hole geochemistry that a focus for uranium mineralization may exist in the W margins of the dyke-sill complexes where they contact the major NW-striking fault set, S of the copper mineralisation found in MURD 0002, as indicated in **Figures 22-27**, although indicators are not robust. In UC 18, there are a number of (tentatively-defined) magnetite depleted zones near sets of the NW-striking faults, with one or two of these associated with very weak alpha-track anomalies. This relationship is also possibly developed in UC22, where there is a spotty cluster of alpha track ratio anomalies at the NW end of this target.

(3) As uranium plays UC27 (August), 28, 29, and 30 (**Figure 17**, **18**) likely represent the more conventional style of unconformity-associated uranium target, exploration focus must initially be on definition of the unconformity between the Westmoreland Conglomerate and the Murphy Metamorphics, and on ensuring that the Westmoreland Conglomerate is largely free of mafic dyke-sill complexes at or near its base. This is necessary because the unconformity position and the nature of the Westmoreland Conglomerate is not well defined in this sector of the Murphy Project. The current interpretation indicates that the four uranium targets here apparently possess a number of apparently vary favourable features, although the robustness of the interpretation here is low because of the greater depth of cover and greater thickness of the APB.

(4) Initial exploration evaluation of uranium plays UC 37 (August), 38, 40, 42, and 43 (**Figure 15**) must comprise a bedrock test of their associated U^2/Th anomalies, noting that

such anomalies may be laterally offset from their bedrock sources. Two of these plays, UC38 and UC40, are rated highly, and are deserving of an early evaluation. If evaluation of these plays generates success, then additional U^2/Th anomalies nearby, and particularly, the array of apparent magnetite-depleted faults or joint sets within a mafic dyke-sill complex close to the unconformity ~ 5km NW of UC38 requires evaluation for Nabarlek style uranium mineralisation. Plays UC37, 38, 40, 42 and 43, like those noted in (2) above, also represent opportunities for the more conventional style of unconformity-associated style of uranium mineralisation, albeit better than the targets noted in (2). Definition of these plays depended more on occurrence of well-defined U^2/Th anomalies coupled with a geological setting indicating thicker Westmoreland Conglomerate relatively free of mafic dyke-sill complexes close to the unconformity.

(5) Uranium plays UC 15 (August), 24, and 39 (**Figure 15**) similarly require evaluation through bedrock testing of their associated U^2/Th anomalies, noting again that these anomalies may be offset from their bedrock sources. All these targets have been defined on a predominantly empirical basis: occurrence of clusters of U^2/Th anomalies close to inferred contractional faults comprising the horsetail contractional fault array near the S end of the Emu Fault Zone. Target UC15, however, remains from an earlier play defined in the preceding interpretations of the Murphy Project, but has been retained because of a coherent zone of anomalous alpha-track readings which appear to display a trend parallel to, and overlapping, NW-striking contractional faults. UC24 and UC39 may represent opportunities for vein-array uranium mineralisation peripheral to or within stocks of the Nicholson Granite.

(6) Exploration of uranium plays UC 6 (August), 17, 23, 31, 32, 33, 34, 35 and 36 (**Figures 15**, **16**, **18**) present the more difficult challenges in the exploration programs in the Murphy Project, as they represent concealed targets for Westmoreland (Redtree or Junnagunna) analogues. Drilling in the areas of the targets requires focussing on the contacts between mafic dykes or Seigal Volcanics and the Westmoreland Conglomerate. Of these targets, UC 6, 17, 23, 31, 32, and 36 are of most interest, particularly noting that these targets are either close to the margins of stocks of Nicholson Granite beneath the Westmoreland Conglomerate, or are within the Bouguer Gravity gradients as indicated by the “gravity worms” (**Figures 19**, **20**). The zones of apparent magnetite-additive alteration in the S end of UC 31, and in the N end of UC 6 should also be examined for unusual styles of copper mineralisation, perhaps akin to low temperature styles of iron oxide-copper-(gold)–uranium styles of mineralisation during evaluation of the respective targets. There are also indications that some of these targets may be associated with altered dykes, with hints of such along the NNW-striking contractional faults in the McArthur Basin here. There is weak alpha-track or U^2/Th anomaly support for UC 17, 31 and 32

(7) Target UC 4 (August) (**Figures 5**, **7**, **8**) requires initial evaluation aimed at determining if the inferred lithological relationships within it are likely to be valid. If so, then the target will have some potential for a complex vein-array style of copper mineralisation, more akin to low temperature iron oxide-copper-(gold)-uranium styles of mineralisation, particularly in the vicinity of the higher-amplitude magnetic anomalies in the target. UC 4 is in a complex structural setting, in some ways analogous to that of the HYC deposit, except that inferred adjacent reduced units of the McDermott Formation or other fine-grained siliciclastic sedimentary rocks or dolomite are within the Tawallah Group, with the possibility of a small fault bound basin containing the reduced units abutting fault bound “horsts” of Westmoreland Conglomerate and Seigal Volcanics in the Emu Fault

zone within the target. However, it is not known if the Emu fault Zone was active during deposition of the inferred reduced units just E of this target. There is no support for uranium potential here in the alpha-track data, although there is weak support from U^2/Th anomalies in the NW sector of the target.

(8) Target UC41 (**Figure 9**, **13**, **14**, **18**) requires evaluation if modelling of sources of the magnetic anomalies in this target indicate shallow depths. If permissive, the higher amplitude magnetic anomalies within it require a targeted drill test. This target is within a very favourable structural and redox setting, with likely good potential for (lower temperature) styles of iron oxide-copper-(gold)-uranium mineralisation. Potential for uranium is adjudged to be good because the target appears to contain a pronounced redox boundary: a complex, magnetite-bearing mafic sill overlying the Westmoreland Conglomerate. The anticline is constrained by left-stepping bends in a pair of NNW-striking contractional faults, indicating that the faults here may have a dextral component of strike-slip displacement. Magnetic anomalies associated with the inferred sill indicate complex magnetite-additive alteration and local magnetite-destructive alteration, a potentially very favourable feature.

(9) Exploration evaluation sequence of the targets is clearly constrained by location within the Murphy Project area, individual target technical rank order scores, and empirical indications for mineralisation generated in programs so far. Applying these concepts indicates that evaluation first focuses on the copper-(uranium) mineralisation and alteration defined in UC 19, with the area of most interest in this target likely to be S from MURD 002, as noted above (**Figures 22-27**).

(10) Next in the order are UC 38, UC 40, UC 28, UC 29, UC 17, UC 41, UC 37, UC 31, UC 23, UC 18 and UC 6, with the specific order constrained by local geographic and logistical constraints, noting that target technical rank orders will most likely change as knowledge is acquired. Targets UC 28, 29, 30 and 35 will likely represent deeply buried opportunities, with consequent need to more rigorously quantify likely depths of prospective rock units through more constrained modelling of the aeromagnetic date prior to drill evaluation.

(11) Even though the exploration emphasis has switched from targeting the more conventional style of unconformity-associated uranium mineralisation in the central sector of the project area, targets UC 18, 19, 22, 24, 25, 26, all initialled defined as opportunities for unconformity style mineralisation, remain of interest for “Nabarlek styles” of mineralisation.

(12) If the project generates success with discovery of uranium mineralization of potential economic significance, then the apparently extensive U^2/Th anomalies outside the current Murphy Uranium Pty Ltd exploration tenements should be acquired. Anomalies of most interest are ~11km NW of UC 35 (**Figure 16**), and ~ 8km S of UC 25 (**Figure 15**). The latter anomaly, however, falls within tenements currently controlled by Marengo Mining Pty Ltd, who are diluting their interest in them to Mega Hundmarsh Pty Ltd, who are apparently exploring for unconformity style uranium through evaluation of the magnetic anomalies in the tenements.

(13) The interpretation generated apparently interesting opportunities for mafic dyke-sill complex associated nickel-copper mineralisation within eight plays. Recommendations for evaluation of these plays follow below.

(14) Although noted in our October report, in logging drill chips or drill core, systematization of logging legends assists greatly, especially when coupled with use of standard abbreviations such as “f.g” for fine-grained, with omission of phrases that are possibly redundant, for example, “brown in colour” (use “brown”). In general, when describing rocks, experience indicates it is best to start with a rock name, then colour, oxidation and weathering state, grain-size, fabric (including degree of sorting, crystallinity, et cetera), and then texture, followed by specific features such as veins, clots, spots, clast composition, et-cetera, finishing with key minerals in decreasing order of abundance. It is important to systematize drill-logging legends early in a project as later data capture become very difficult and time consuming if this is not done. In naming rocks, consistent and accepted nomenclature should also be used, for example, the USGS granite and volcanic rock nomenclature

The interpretation generated eight interesting, but relatively high-risk targets for dyke-sill-complex associated nickel-copper mineralisation somewhat analogous to that of the Jinchuan mineralisation, and in some respects, to Noril’sk. The recommendations pertaining to the nickel copper targets are:

(1) An early attempt should be made to collect samples of the inferred dyke sill complexes of interest. Because of the compositional variability of nickel-copper mineralised dyke sill complexes, samples should be obtained close to inferred dyke-sill complex feeder zones, for example, those in BM 9, 14, and 17 (**Figure 15**, **16**, **17**), and possibly from parts of the inferred dyke-sill complex within uranium target UC25. It is important that sampling be spread over the inferred intrusive centres within several targets, and to focus on the foot-wall zones of individual intrusive complexes. The samples then should be examined for occurrence of phenocrystic Mg-predominant olivine, or Mg-predominant phyllosilicate replacement products of olivine, within rocks such as olivine gabbro, picritic gabbro, olivine dolerite, and picritic basalt. Samples should then be analysed for major elements to determine if Mg numbers are of the order of 0.5 or greater, and for the standard suite of trace elements to check for Ni, Cu (i.e. chalcophile element) depletion, for Cu/Zr ratios, and for evidence of crustal-rock contamination, by examining trace element ratios such as La/Yb, La/Sm vs SiO_2, and Re/Os isotope systematics, for example.

(2) If collection of samples of inferred dyke-sill complexes is not feasible, then a program of “deep-looking” EM is recommended for the better targets, namely BM 9, 14, 16, and 17, although variably thick Phanerozoic and Neoproterozoic cover may present problems, with follow up drill evaluation of individual EM anomalies.

(3) If surface sampling and the EM is ineffective, then the four highest priority and shallowest nickel-copper targets should be subjected to one traverse each of RAB or RC drill holes to magnetic anomaly source. These targets are BM 9, 14, 16, and 17. In BM 9, Westmoreland Conglomerate covers much of the dyke-sill complex, so the evaluation drilling must be targeted on the highest amplitude magnetic anomalies with shallowest depth to source, and these are on the W and S margins of target BM 9.

(4) Inferred host rocks in targets BM 19 and BM 20 (**Figure 18**), although in a technically very encouraging setting, are likely to be buried to depths of the order of 300 to 400m, with mineralisation in them likely to be of the several hundred metres deeper than host

rock tops. Consequently, these targets should only be scheduled for evaluation if success is obtained in evaluation of the other nickel-copper targets.

(5) The order of evaluation of the nickel copper plays should proceed in decreasing order of technical rank score, with an initial focus on the shallowest plays. Thus BM 14, BM 16, BM 17, and BM 19 require earliest evaluation. Evaluation of BM 15 must focus on the footwall position of the dyke-sill complex here.

(6) The footwall of the inferred dyke-sill complex in Target BM 18 is likely to be blind, and be of most interest next to the major NW-striking fault here. If BM 18 evaluation generates success, then the higher amplitude magnetic anomalies ~3km E of this target likely represent a continuation of the same dyke-sill complex, in the E limb of the complex syncline hosting BM 18 (**Figure 7**, **16**).

(7) If evaluation of the nickel-copper plays generates success, then the further targets may be indicated by the magnetic anomalies 6-10km S of BM 15 (**Figure 7**). These anomalies are within exploration tenements currently controlled by Marengo Mining Pty Ltd, as noted above.

Overall, the potential of the Murphy Project to host nickel copper mineralisation should not be ignored in future evaluation. As noted, elements of the geological setting are encouraging, and there is encouraging elevated nickel response in drill hole MURB 006, 010, 009, 029, 038, 108, and 125, all within target UC19. Target UC19 is between nickel-copper targets BM 17 and BM 18.

Observations and Cautions

The significant changes to the October, 2008 interpretation are evident upon comparison of the respective interpretations in the accompanying ARC VIEW project: the May and October interpretation are both included in the project as separate layer files.

Key points arising from the new interpretation are:

(1) It is emphasised that the interpretation is not necessarily geologically robust, simply because of the absence of subsurface data over most of the area interpreted. Consequently, the interpretation was designed to highlight possibilities for ore occurrence: in the event of ambiguity, the more optimistic alternative was chosen so as to maximise chances of discovery of new opportunities. For example, the aeromagnetic data signature indicates, but does not prove that the dyke-sill complexes disappear from the Westmoreland Conglomerate in the SW sector: such an indication was thus used to define targets for unconformity-style uranium mineralisation in the SW sector.

(2) The new interpretation defined likely extensions to the Westmoreland Conglomerate or an older coarse-grained siliciclastic unit to the SW, along a more deeply buried northern margin of the Murphy Inlier, and it more robustly defined the extent of the mafic dyke-sill complex at or near the base of the Westmoreland Conglomerate within the central part of the Murphy Project area. To simplify the interpretation, limits of the mafic dyke-sill complex likely exposed on or near the unconformity at the top of the Tawallah group were only defined. It is clear that the dyke sill complexes comprise part of a very extensive sheet like body at or near the base of the Westmoreland Conglomerate in the central parts of the Murphy Project area.

(3) Likely extensions of the Seigal Volcanics to the SW and in the N sector of the project were also defined, although in the SW sector, definition of the likely extent of the Seigal Volcanics is extremely tentative. It appears that the Seigal Volcanics may display variable magnetic susceptibilities in the SW sector, with consequent greater difficulty in defining their extent. The aeromagnetic and Bouguer Gravity worm data indicate that the Seigal Volcanics become much thicker in an area immediately W of the area interpreted, being bound by a series of W-side down, N or NNW-striking faults marking a major crustal break in this region.

(4) A significant additional component of the current interpretation comprises definition of concealed plutons of Nicholson Granite, noting that this granite displays a "magnetically-subdued" grading to "magnetically dark" signature, which made precise definition of location difficult. However, Bouguer Gravity and magnetic worms assisted in definition of likely granite pluton margins. All attempts were made to define the margins of the "basement granites" in the Murphy Inlier, as the margins of such granites play an important role in localising unconformity style uranium mineralisation in the Pine Creek Orogen. Definition of basement granites generated a pattern of distribution that indicates a major crustal-scale basement geological domain boundary occurs in the W sector of the area interpreted, with this break defining the E margin of a thick and extensive accumulation of Seigal Volcanics or their temporal correlatives.

(5) Like the October interpretation, definition of extensions of the Westmoreland Conglomerate into regions originally interpreted to represent concealed Murphy Metamorphics is extremely tentative, and is very difficult to do robustly because of the short and moderate wavelength signal within the aeromagnetic data caused by the APB, and because of the locally magnetically-transparent nature of the Westmoreland Conglomerate. The position of the inferred unconformity as shown in the accompanying ARC VIEW project in the SW sector of the Murphy Project area is thus very tentative, and was defined through identification of the margins of domains of longer-wavelength magnetic data signature.

(6) The Bouguer Gravity signature and an absence of complex, low-amplitude, longer-wavelength signature in the aeromagnetic data in the area of nickel-copper target BM 17 could indicate that a large pluton of Nicholson Granite is here, or that granite and a volcano-tectonic depression filled with clastic sediment exists here. The very low amplitude of the gravity anomaly and longer wavelength component of the aeromagnetic data signature indicates that a local basin is likely developed over the top of the granite pluton, next to the interpreted mafic dyke-sill complex in target BM 17. There is a combination of unusual signatures in the aeromagnetic data and Bouguer Gravity data, including remnantly magnetised sources likely to represent composite mafic intrusive rocks. The basin may therefore represent a volcano-tectonic depression; and the combination of remnantly-magnetised and normally magnetised sources in the inferred intrusive complex here are very favourable signatures for nickel-copper occurrence.

(7) Magnetic worms were used in an attempt to define dips on the fault sets in the Murphy Project area. In many areas, the data appeared contradictory to geological indications, but the information in the magnetic worms provided the primary guide. The Bouguer Gravity worms proved valuable in assigning technical rank scores to the targets, noting the relation between unconformity-associated uranium mineralisation and the worms in the Pine Creek Orogen.

(8) A reappraisal of the gamma-equivalent U_3O_8 values, carbonate distribution, illite composition and crystallinity, indicator mineral assemblages, and the distribution of best-in-hole values for La, Zn and Cu in UC 19 indicates an encouraging target in the central part of UC 19, in the area S of MURD002, likely within the magnetically-dark zones here, as shown in **Figures 22-27**. There is a marked discordance in the best in hole Zn values and the La values – the Zn values indicate the far N sector is likely to be a distal or outflow end; and the La values, which locally correlate with the gamma-equivalent U_3O_8 values show that a small part in the central part of the target S of MURD002 is likely to be the proximal or inflow end, and therefore of most interest for uranium mineralisation. Alteration mineral indicators and illite crystallinity values are consistent with is conclusion. However, the very encouraging copper and anomalous uranium within drill hole MURD 002 coupled with the observation that the Tawallah Group here has better potential for Nabarlek-style uranium mineralisation, indicates that it is the central sector of this target that is of most interest, although the distinctive curvilinear zone of apparent magnetite-destructive alteration that trends to the NW from MURD004 may also be of interest. Clearly, fault bound contacts between the mafic intrusive dyke-sill complex and the Westmoreland Conglomerate must be targeted. As noted in the footnotes to Figures 22-27, fault bound contacts defining the W margins of individual bodies of the mafic intrusive complex are likely to be of most interest.

(9) The alteration associated with the copper mineralisation in MURD 002 indicates that the mineralisation has some affinities with lower-temperature styles of iron oxide-copper-gold mineralisation, such as that at Manto Verde or El Soldado in Chile. The predominance of copper in the mineralisation indicates that drill hole MURD 002 is likely to be “up-flow” in the ore forming system from the uranium (and possibly gold) predominant part of the system. The observations in (8), and noting that this part of the McArthur Basin is more likely to have potential for Nabarlek analogues, indicate that the uranium-predominant part of this system is likely to be S from MURD 002, close to the fault plane, and where mafic intrusive rocks contact the fault plane. The heat engine for this system may well have been the adjacent large body of Nicholson Granite, suggesting that fluid flow in a hydrothermal ore forming system here may have been from the SE, in towards the granite.

The Murphy Project continues to generate interest, with results from UC 19 indicating that there could be a body of Cu-U mineralization in the central sector of this target, on or close to the contacts between Westmoreland Conglomerate and the mafic dyke-sill complex, where this contact is fault bound. Of the uranium targets, UC19, UC40, UC17, UC38, UC41, UC23, UC31, and UC18 are adjudged to have highest technical rank orders, and of the base metal targets, BM14, BM17, and BM19 are of most interest.

The interpretation completed here indicates that although the predominant uranium ore style is now more likely to be analogous to the Nabarlek mineralisation, or to the Redtree or Junnagunna mineralisation at Westmoreland, the potential is regarded as excellent. Additionally, there is now indicated potential for the more conventional style of unconformity-associated uranium in the SW sector of the Murphy Project area, and encouraging indications of potential for nickel copper mineralisation in the central parts of the Murphy Project area, particularly in target BM17.

Figure 1: Location and Targets: Murphy Project

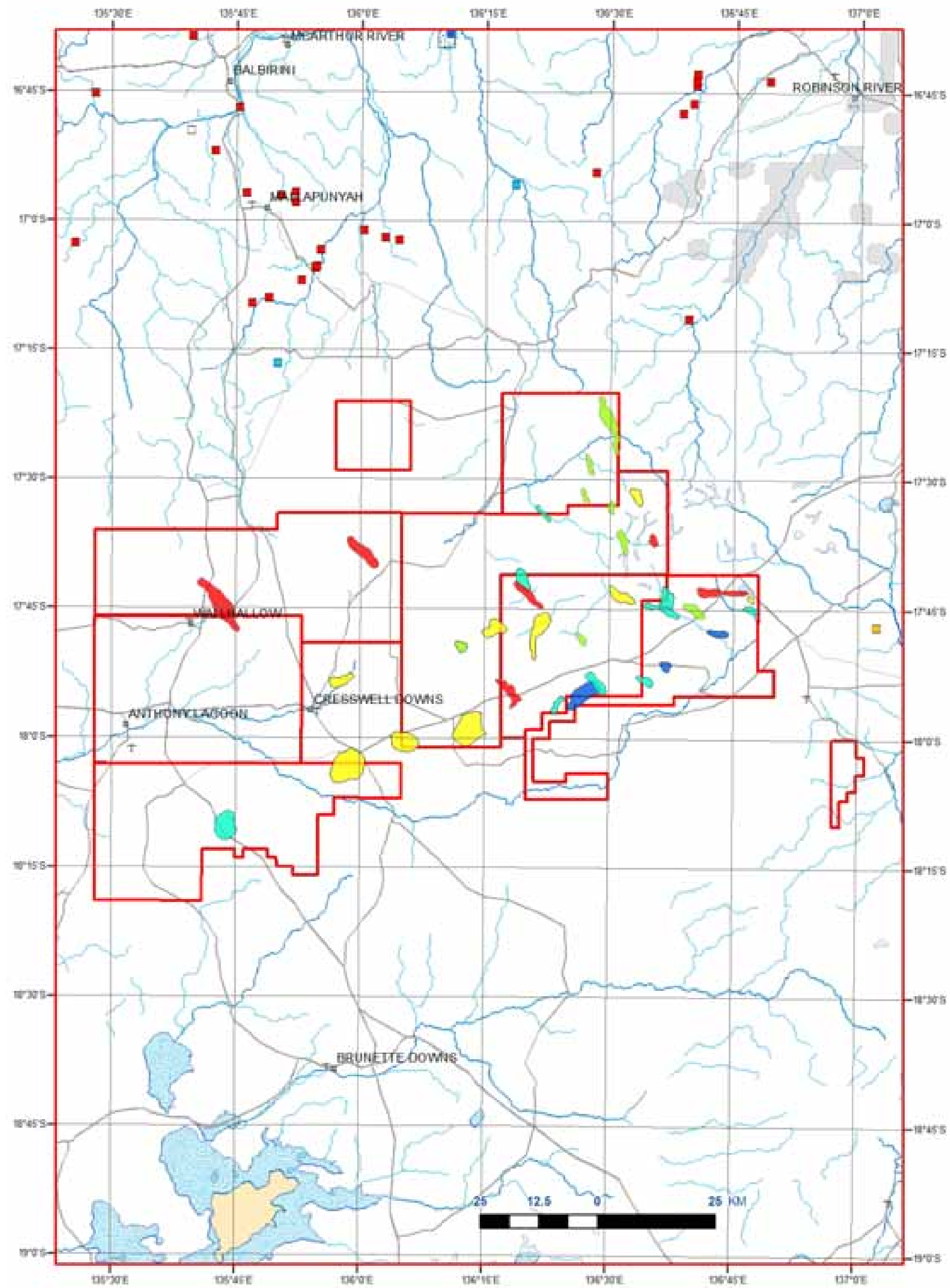

Figure 1 illustrates the location of the Murphy Project study area, which is within the main group of exploration tenements, outlined in red. Principal geographic features are shown, which are from the Geoscience Australia data sets. The uranium targets and the nickel-copper targets are shown, coloured according to technical rank score. Red represents largest score; dark blue the smallest scores. Targets are identified in succeeding Figures. The interpretation was restricted to the area covered by the principal cluster of Murphy Uranium Pty Ltd tenements. **Abstract**. **Recommendations**.

Figure 2: Location and Targets: Murphy Project

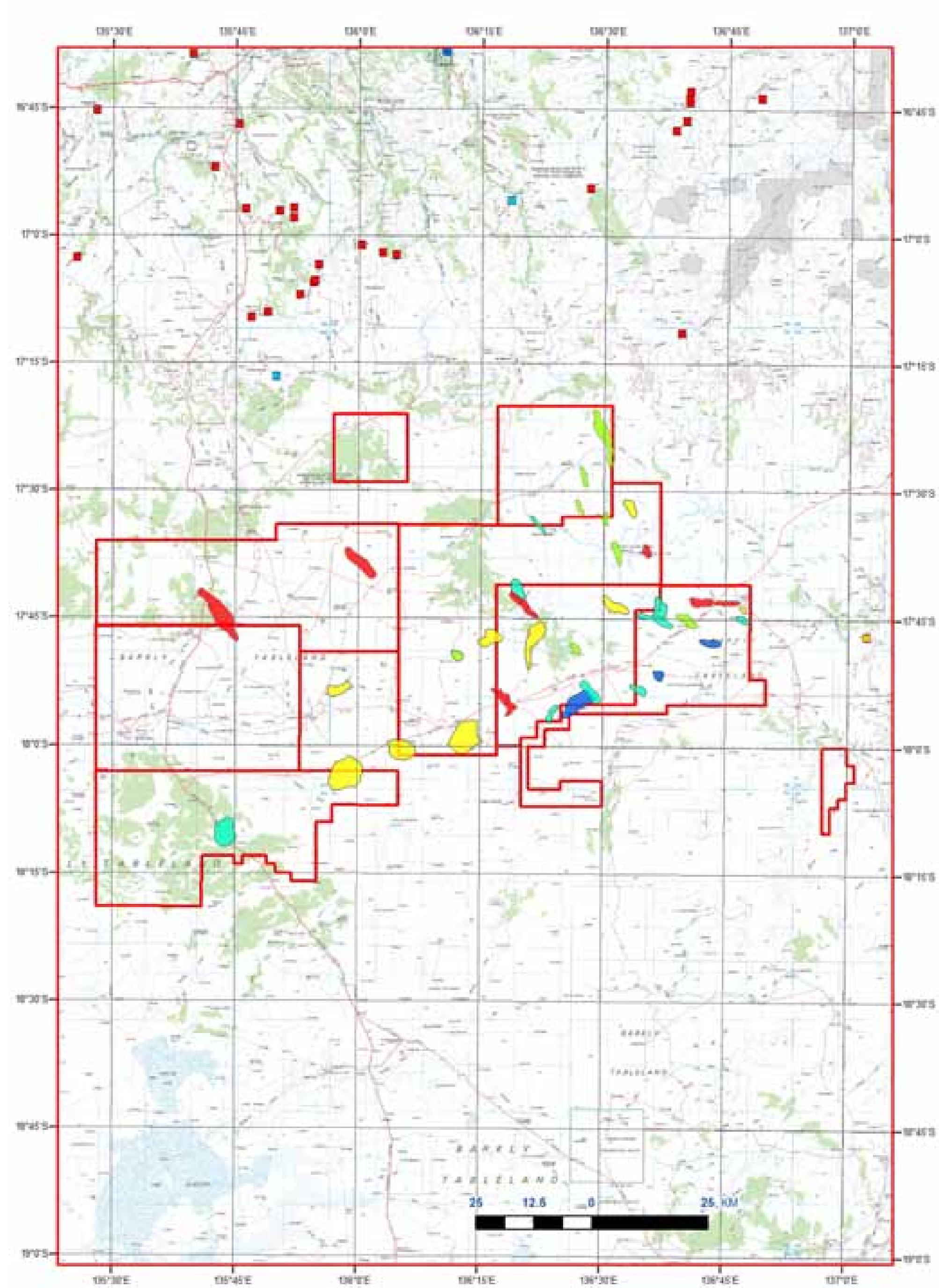

Figure 2 illustrates the location of the Murphy Project study area in relation to a raster image of the geography. The study area was restricted to the main group of exploration tenements, outlined in red. The uranium targets and the nickel-copper targets are shown, coloured according to technical rank score. Red represents largest score; dark blue the smallest scores. Targets are identified in succeeding Figures. The interpretation was restricted to the area covered by the principal cluster of Murphy Uranium Pty Ltd tenements. The small red squares represent copper occurrences; and small blue squares represent lead or zinc occurrences. Raster images are from Geoscience Australia (GA), and mineral occurrence data are from the Northern Territory Geological Survey (NTGS) MODAT data sets. **Abstract**. **Recommendations**.

Figure 3: Uranium and Base Metal Targets: East

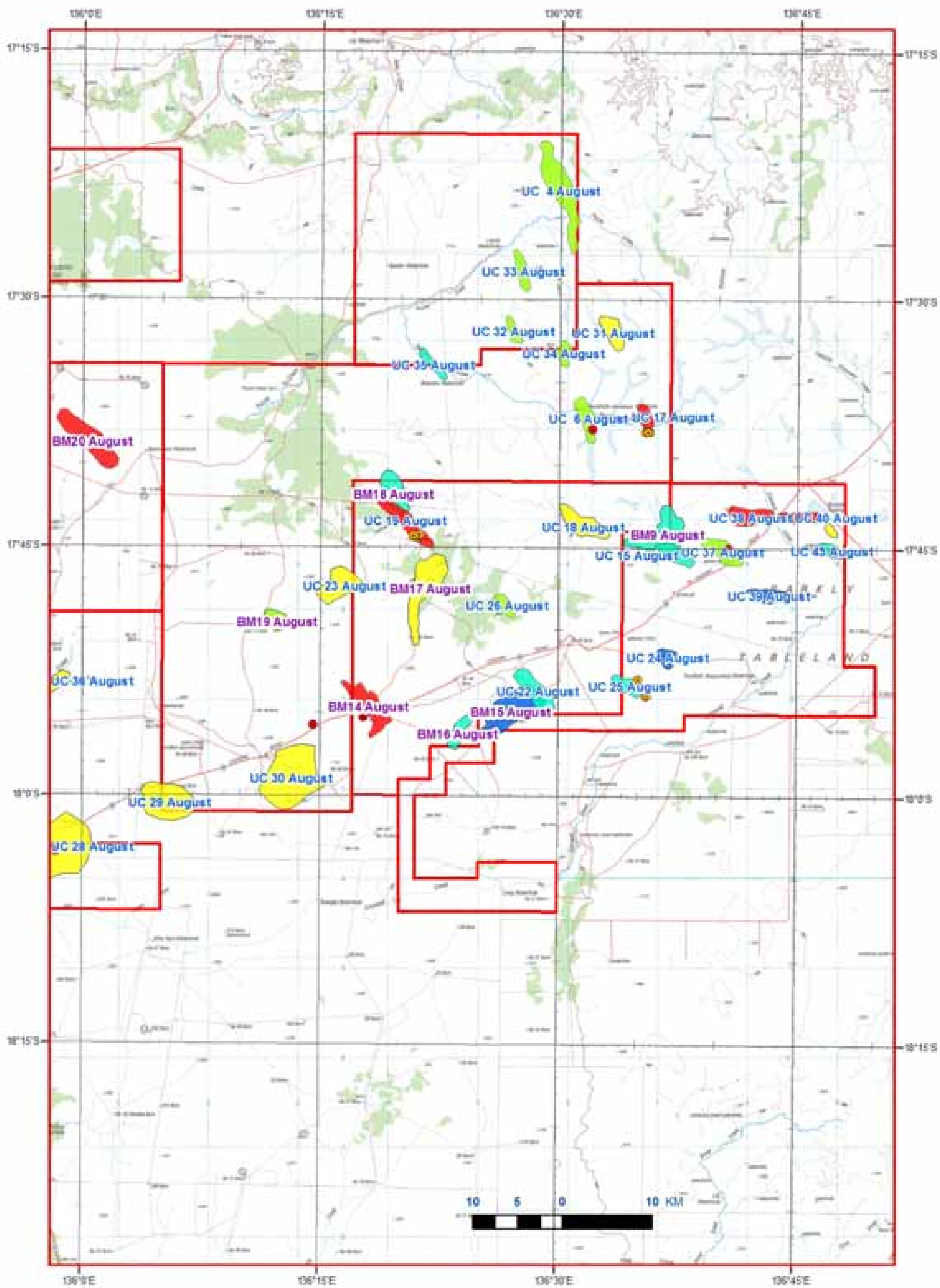

Figure 3 shows the E sector of the Murphy Project, with the uranium targets (blue text) and nickel-copper targets (purple text) refined from earlier studies or defined in the current interpretation. Recently-completed diamond drill holes and proposed diamond drill holes are also shown. Refer to the accompanying ARC VIEW project titled "BML NT UnconfU 250309" for better illustration of the targets, the interpretation and the geological and potential field data setting. **Abstract**. **Recommendations**.

Figure 4: Murphy Project: Simplified Geology: East

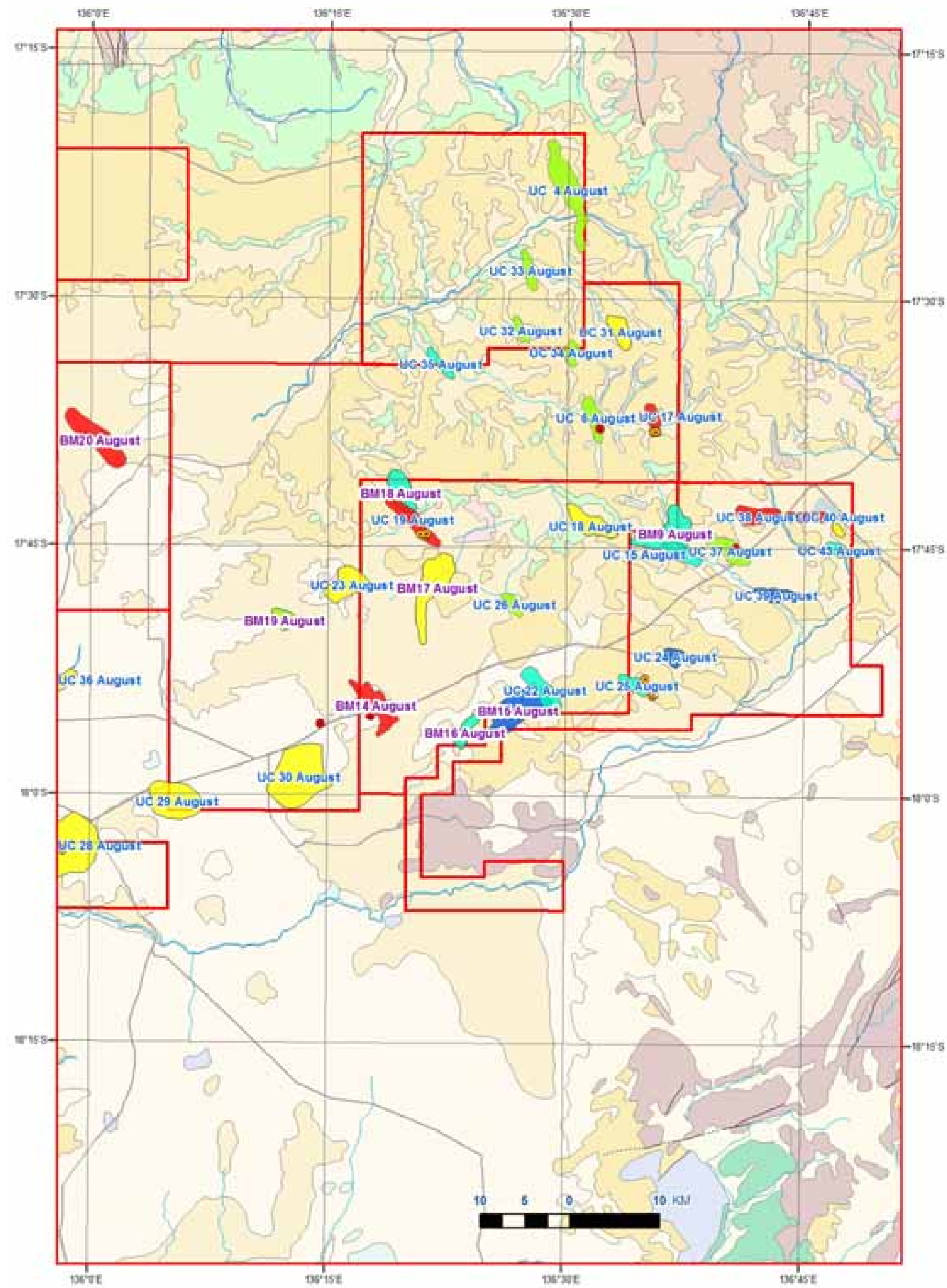

Figure 4 illustrates simplified surface geology taken from the Geoscience Australia NT geological map in the E sector of the Murphy Project area. Pale tones represent Phanerozoic cover sediments; darker browns represent Neoproterozoic sedimentary rocks, grey represents Cambrian Georgina Basin sedimentary rocks, and green represents the Helen Springs Volcanics, which are part of the Antrim Plateau Basalt (APB). **Abstract**. **Recommendations**.

Figure 5: Murphy Project: Working Interpretation: East

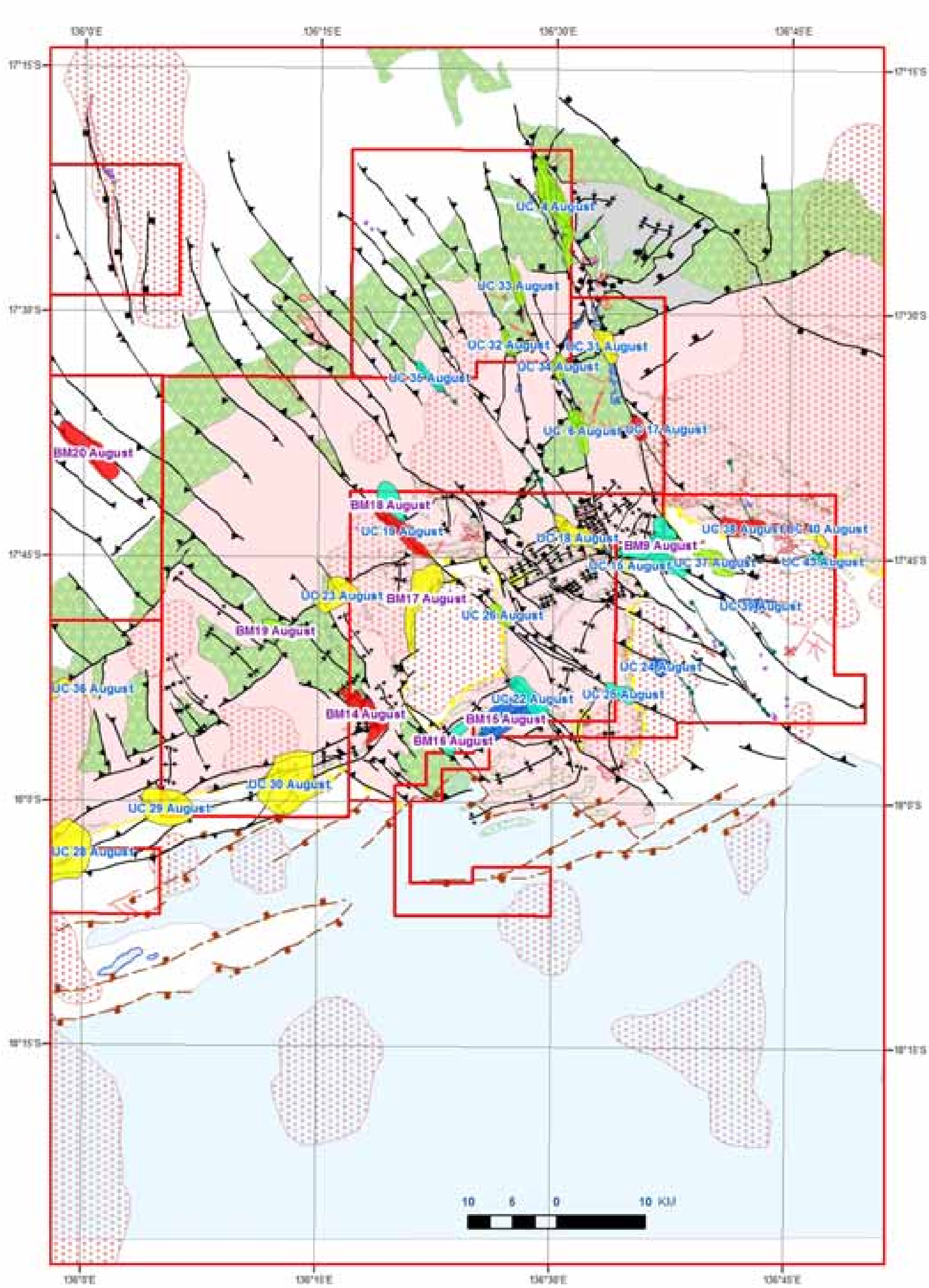

Figure 5 shows the interpretation in the E sector of the Murphy Project. Pale grey is Neoproterozoic sedimentary rocks of the Roper Group, pale pink is the Westmoreland Conglomerate (Tawallah Group), green the Seigal Volcanics and its correlatives, grey the McDermott Formation or f.g siliciclastic sediments and dolomite. Stippled polygons are concealed plutons of Nicholson Granite. Faults shown are predominantly contractional, many inherited from early extensional fault sets in the Tawallah Group. Darker red, smaller irregular polygons represent the highest amplitude and discrete U^2/Th anomalies evident in the radiometric data. The unconformity at the base of the Westmoreland Conglomerate is shown as a yellow line. For additional elements of the interpretation, refer to the footnotes of **Figure 15**. **Abstract**. **Recommendations**.

Figure 6: Murphy Project: Working Interpretation: East II

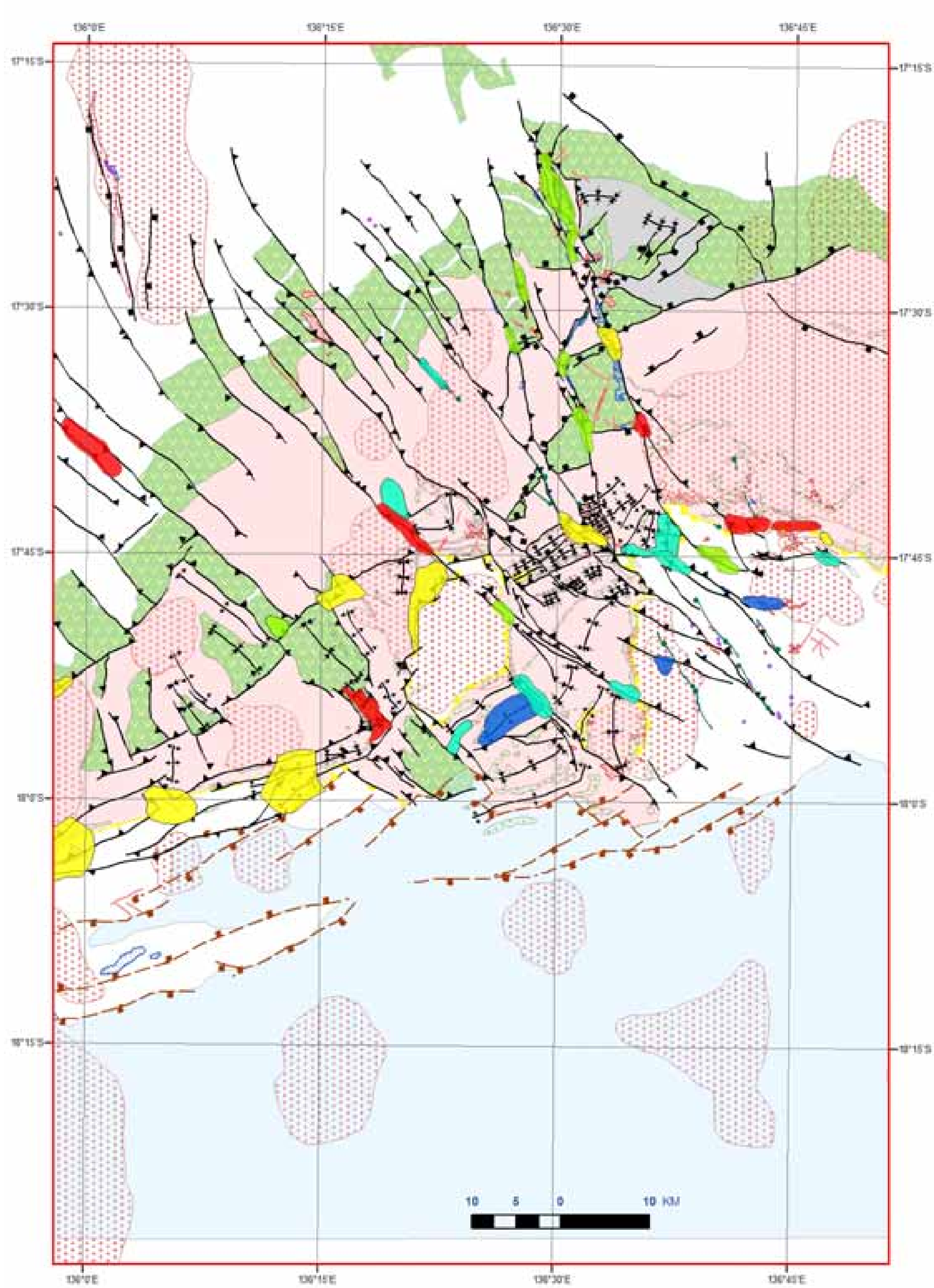

Figure 6 illustrates the working interpretation, and uranium targets, and nickel targets, resulting from the interpretation. Targets are shown here without names to simplify the Figure. Small purple spots represent likely kimberlite pipes, one of which has a very encouraging magnetic signature, comprising remnantly and normally magnetised elements. Most of these are untested in prior exploration programs. **Abstract**. **Recommendations**.

Figure 7: Murphy Project: Aeromagnetic Data: East

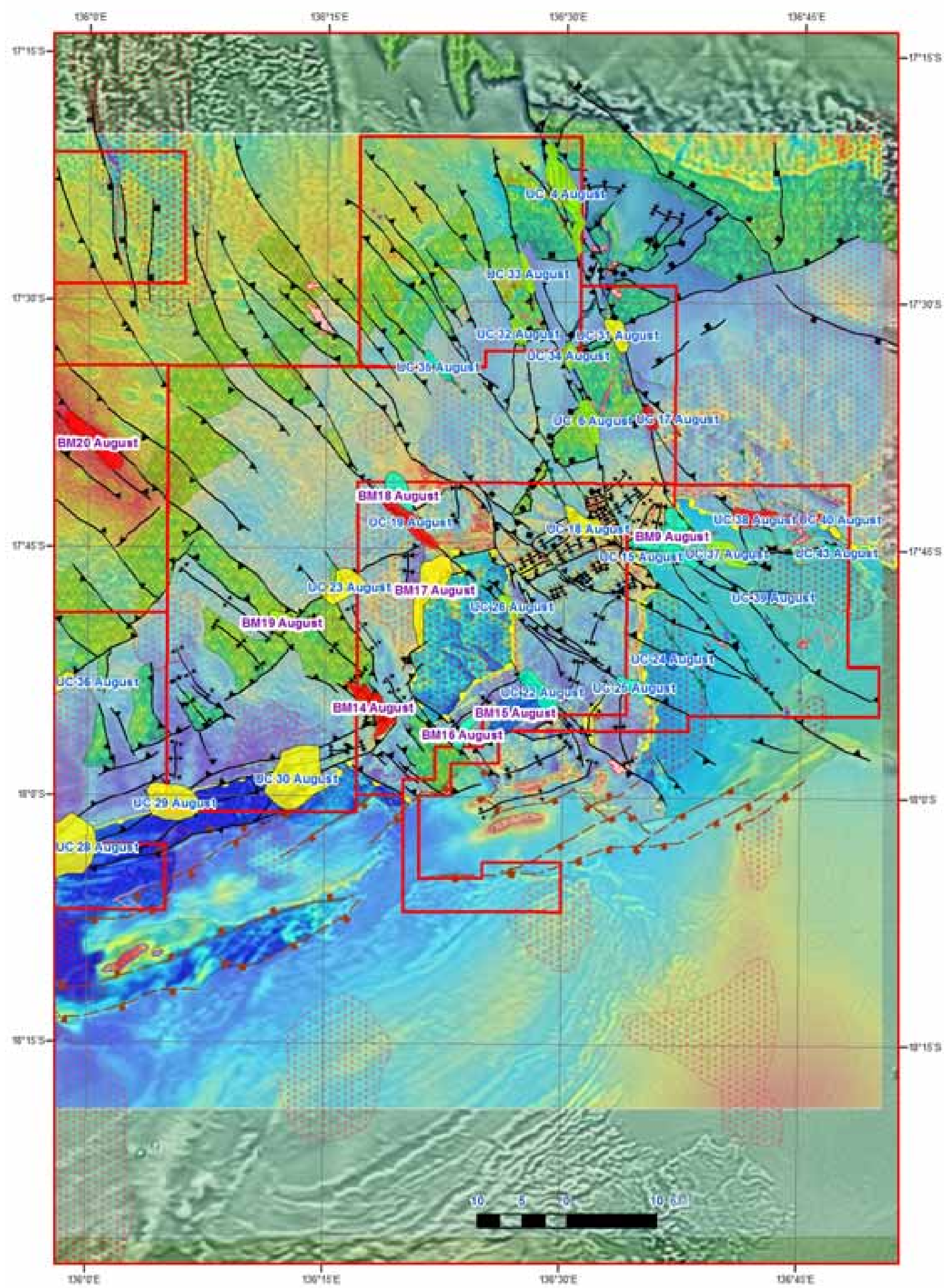

Figure 7 shows the working interpretation and targets superimposed on the aeromagnetic data deployed in the project. Refer to the accompanying ARC VIEW project for a description aeromagnetic data layers used. The aeromagnetic data displayed here is set up to highlight short-wavelength low-amplitude signal, and long-wavelength low-amplitude signal. Detailed aeromagnetic data in the project area is Bondi Mining Ltd data; data elsewhere is from the NTGS, but has been processed in-house to highlight appropriate signal. **Abstract**. **Recommendations**.

Figure 8: Murphy Project: Bouguer Gravity Signature: East

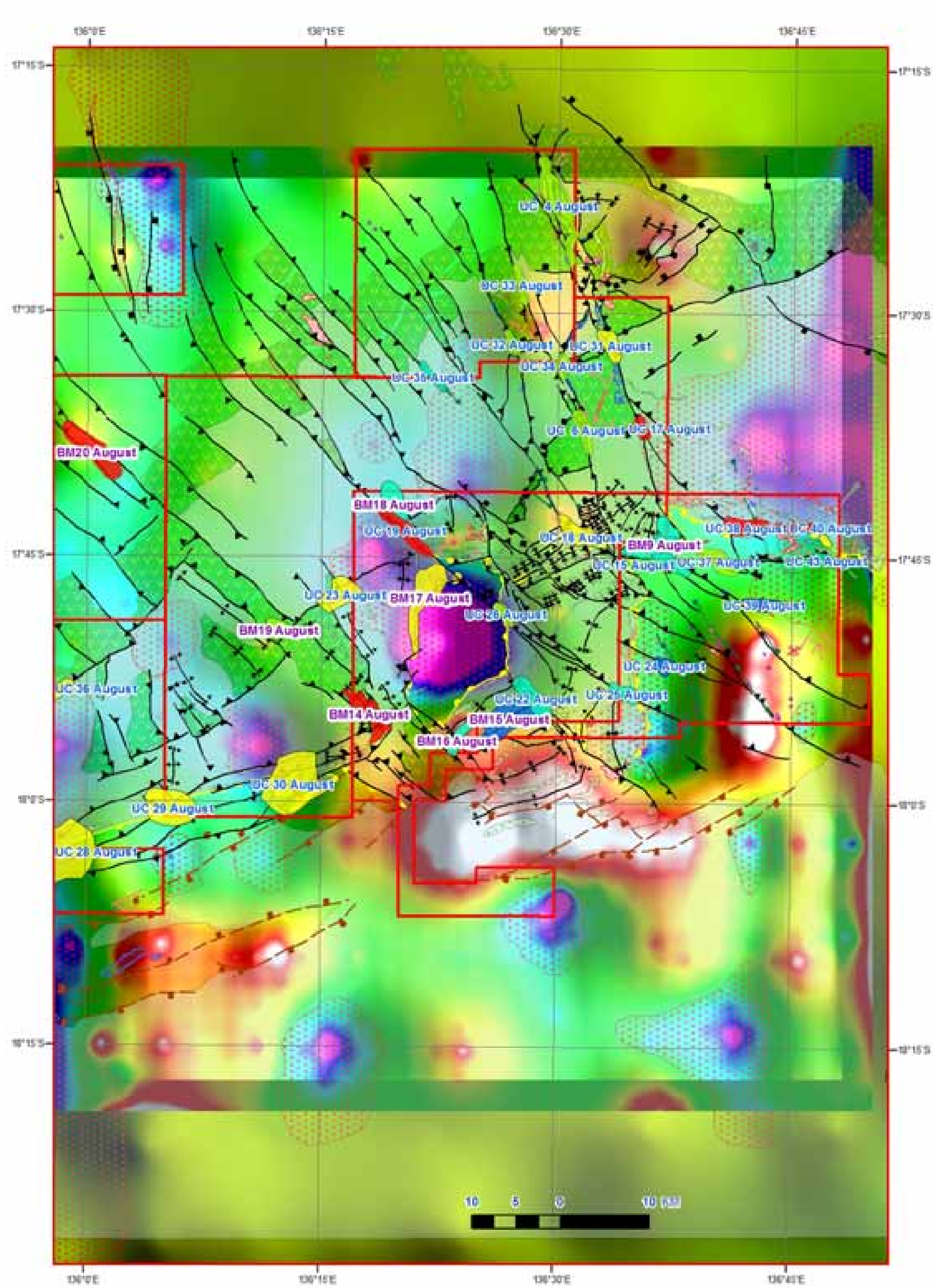

Figure 8 illustrates the Bouguer Gravity signature and the working interpretation. Refer to the accompanying ARC VIEW project for a description of the treatment of the Bouguer Gravity data layers displayed here. The Bouguer Gravity data are from Geoscience Australia. The strong Bouguer Gravity low straddling target BM 17 is notable. Part of it may be caused by a volcano-tectonic depression associated with the emplacement of the dyke-sill complex in target BM17 (see text). Bouguer Gravity worms and magnetic worms were used to refine inferred contacts of the granites and their country rock. **Abstract**. **Recommendations**.

Figure 9: Uranium and Base Metal Targets: West

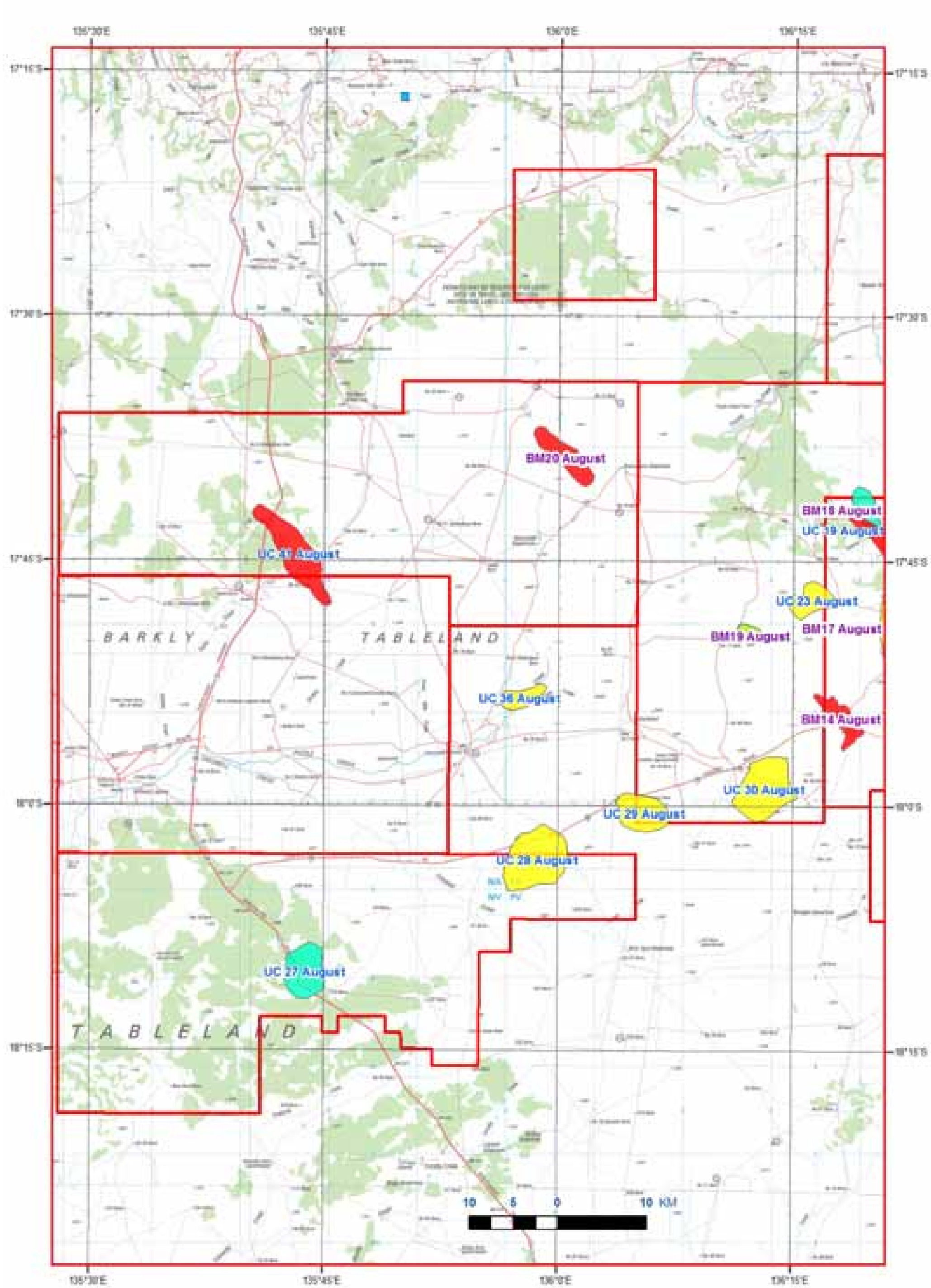

Figure 9 shows the W sector of the Murphy Project, with the uranium targets (blue text) and nickel-copper targets (purple text) refined from earlier studies or defined in the current interpretation. Refer to the accompanying ARC VIEW project titled "BML NT UnconfU 250309" for better illustration of the targets, the interpretation and the geological and potential field data setting. Targets UC 27, 28, 29, and 30 represent plays for the more conventional style of unconformity-associated uranium deposit. Target UC 41 represents a play for a low-temperature iron oxide-copper-(gold)-uranium mineralised system (see text). **Abstract**. **Recommendations**.

Figure 10: Murphy Project: Simplified Geology: West

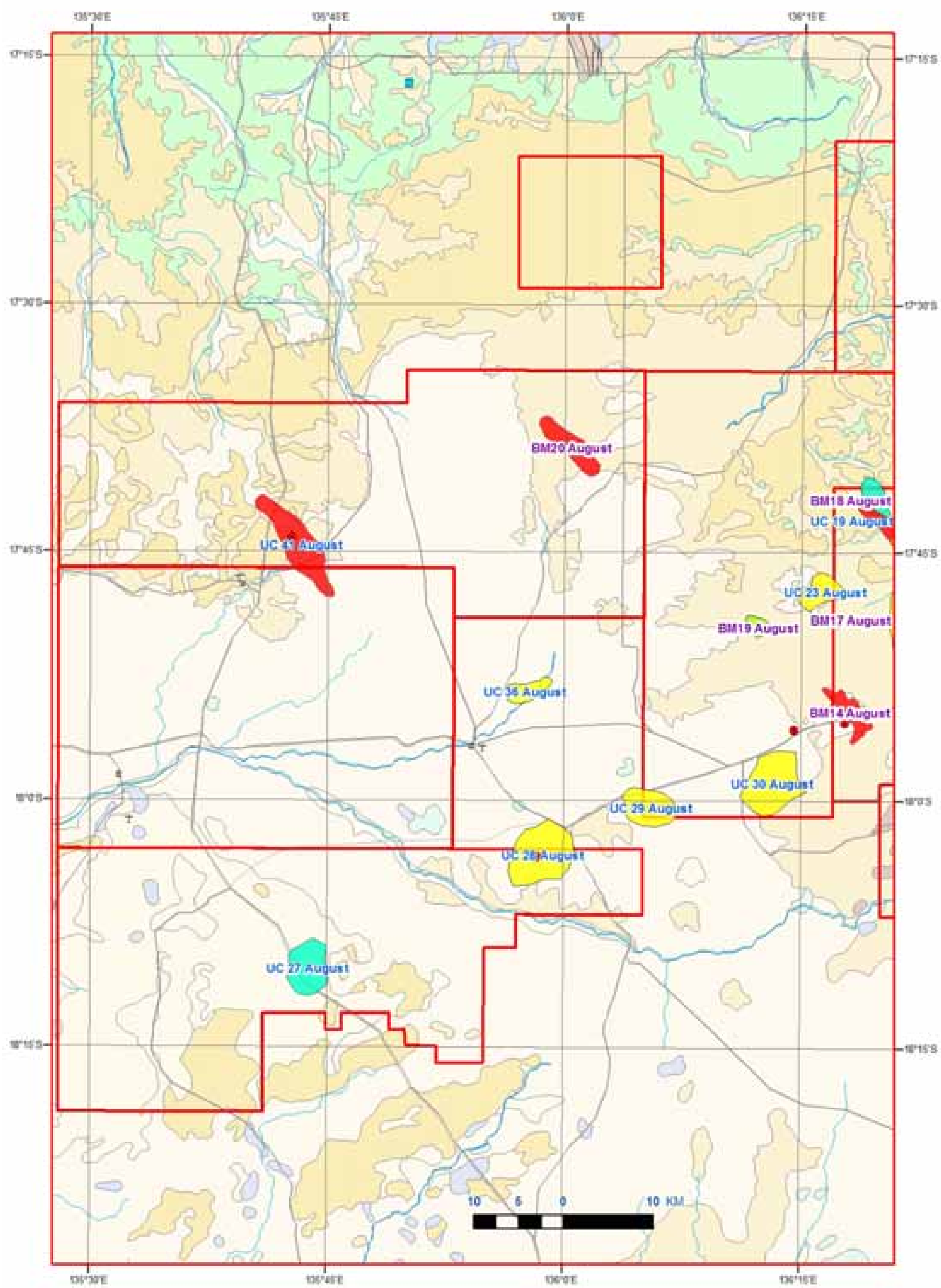

Figure 10 illustrates simplified surface geology in the W sector of the Murphy Project area, which is from the Geoscience Australia NT geological map. Pale tones represent Phanerozoic cover sediments; darker browns represent Neoproterozoic sedimentary rocks, grey represents Cambrian Georgina Basin sedimentary rocks. No Antrim Plateau Basalts appear to be exposed here, although aeromagnetic data indicate that they are extensively developed beneath the Georgina Basin sedimentary rocks here. **Abstract**. **Recommendations**.

Figure 11: Murphy Project: Working Interpretation: West

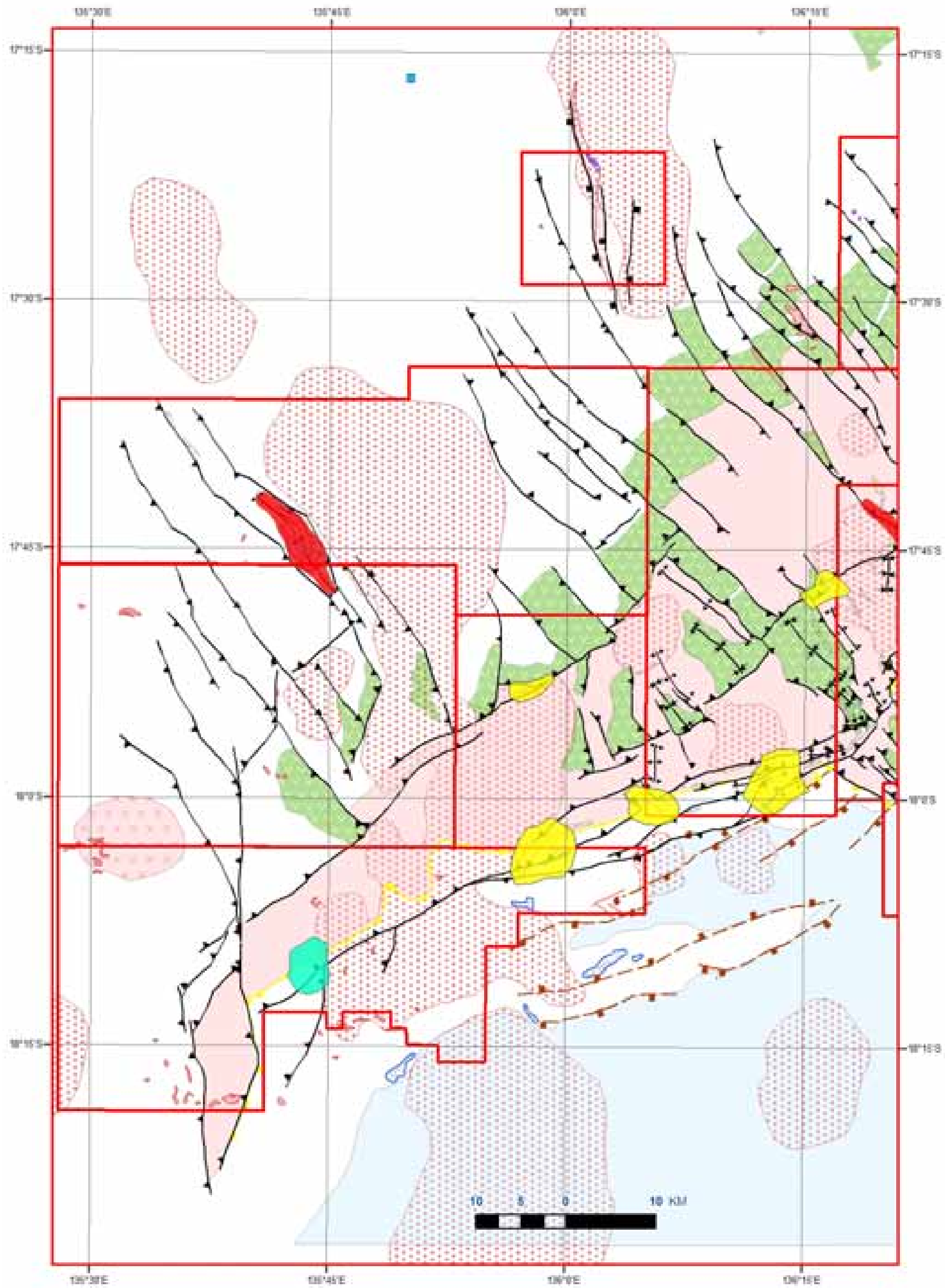

Figure 11 shows the interpretation and the uranium targets in the W sector of the Murphy Project. Pale grey is Neoproterozoic sedimentary rocks of the Roper Group, pale pink is the Westmoreland Conglomerate (Tawallah Group), green the Seigal Volcanics and their correlatives, grey the McDermott Formation or fine-grained siliciclastic sediments and dolomite. Stippled polygons are concealed plutons of Nicholson Granite. Faults shown are mainly contractional, many inherited from early extensional fault sets in the Tawallah Group. Darker red, smaller irregular polygons are the highest amplitude and discrete U^2/Th anomalies evident in the radiometric data. Small purple spots represent kimberlite pipes, all untested. ***Notable is the large body close to the N edge of the outlying exploration tenement in the N-central sector here***. The unconformity at the base of the Westmoreland Conglomerate is shown as a yellow line. **Abstract**. **Recommendations**.

Figure 12: Murphy Project: Working Interpretation: West-II

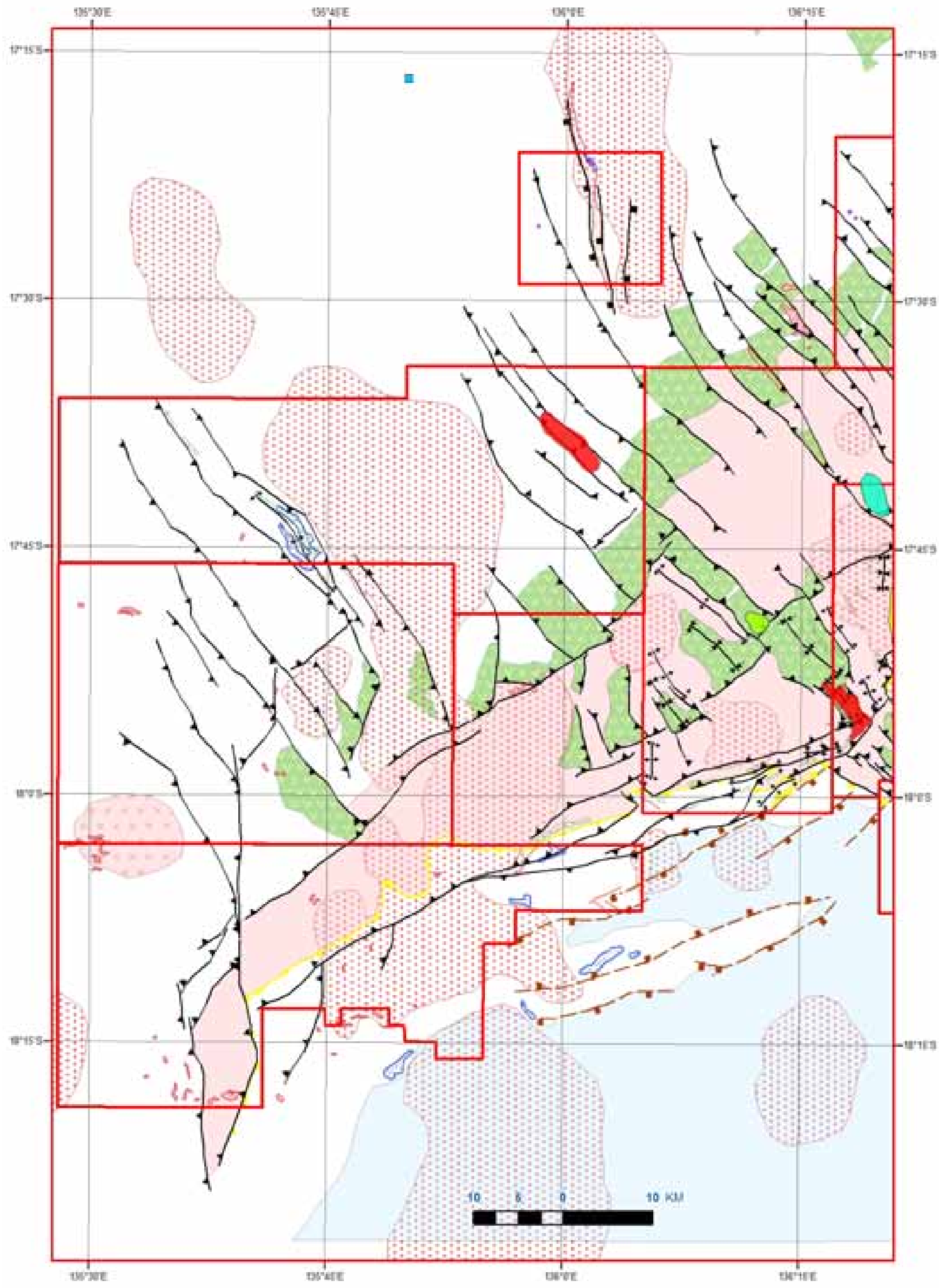

Figure 12 shows working interpretation and the nickel-copper targets in the W sector of the Murphy Project. Pale grey represents Neoproterozoic sedimentary rocks, pale pink represents the Westmoreland Conglomerate, green the Seigal Volcanics, grey the McDermott Formation or fine-grained siliciclastic sediments and dolomite. Stippled polygons represent concealed plutons of Nicholson Granite. Faults shown are predominantly contractional. Darker red, smaller irregular polygons represent the highest amplitude and discrete U^2/Th anomalies evident in the radiometric data. Small purple spots represent kimberlite pipes, all untested. Notable is the large kimberlite body close to the N edge of the outlying exploration tenement in the N-central sector here. The unconformity at the base of the Westmoreland Conglomerate is shown as a yellow line. **Abstract**. **Recommendations**.

Figure 13: Murphy Project: Aeromagnetic Data: West

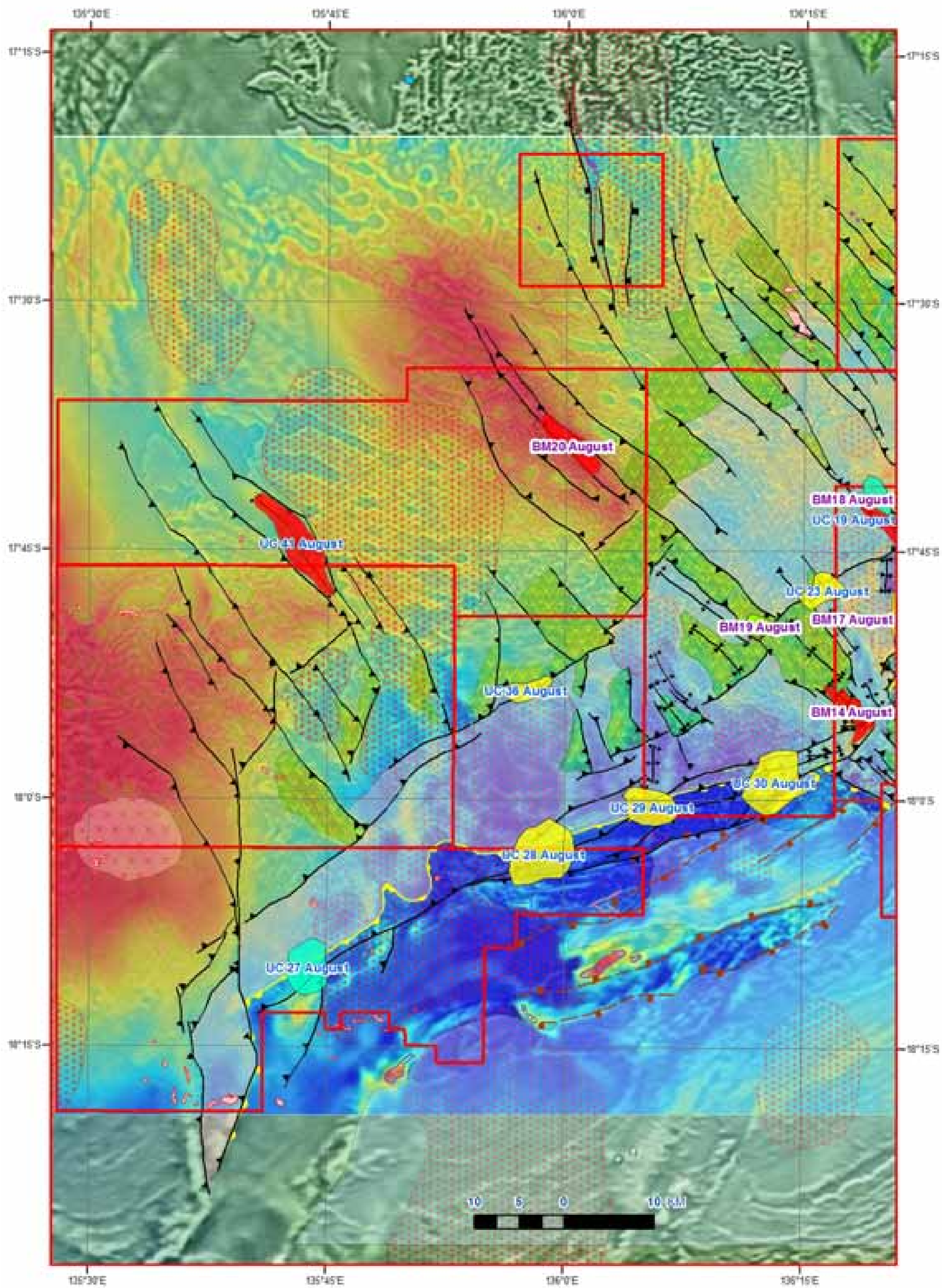

Figure 13 shows the working interpretation and targets superimposed on the aeromagnetic data deployed in the project. Refer to the accompanying ARC VIEW project for a description aeromagnetic data layers used. The aeromagnetic data displayed here is set up to highlight short-wavelength low-amplitude signal, and long-wavelength low-amplitude signal. Detailed aeromagnetic data in the project area is Bondi Mining Ltd data; data elsewhere is from the NTGS, but has been processed in-house to highlight appropriate signal. **Abstract**. **Recommendations**.

Figure 14: Murphy Project: Bouguer Gravity Signature: West

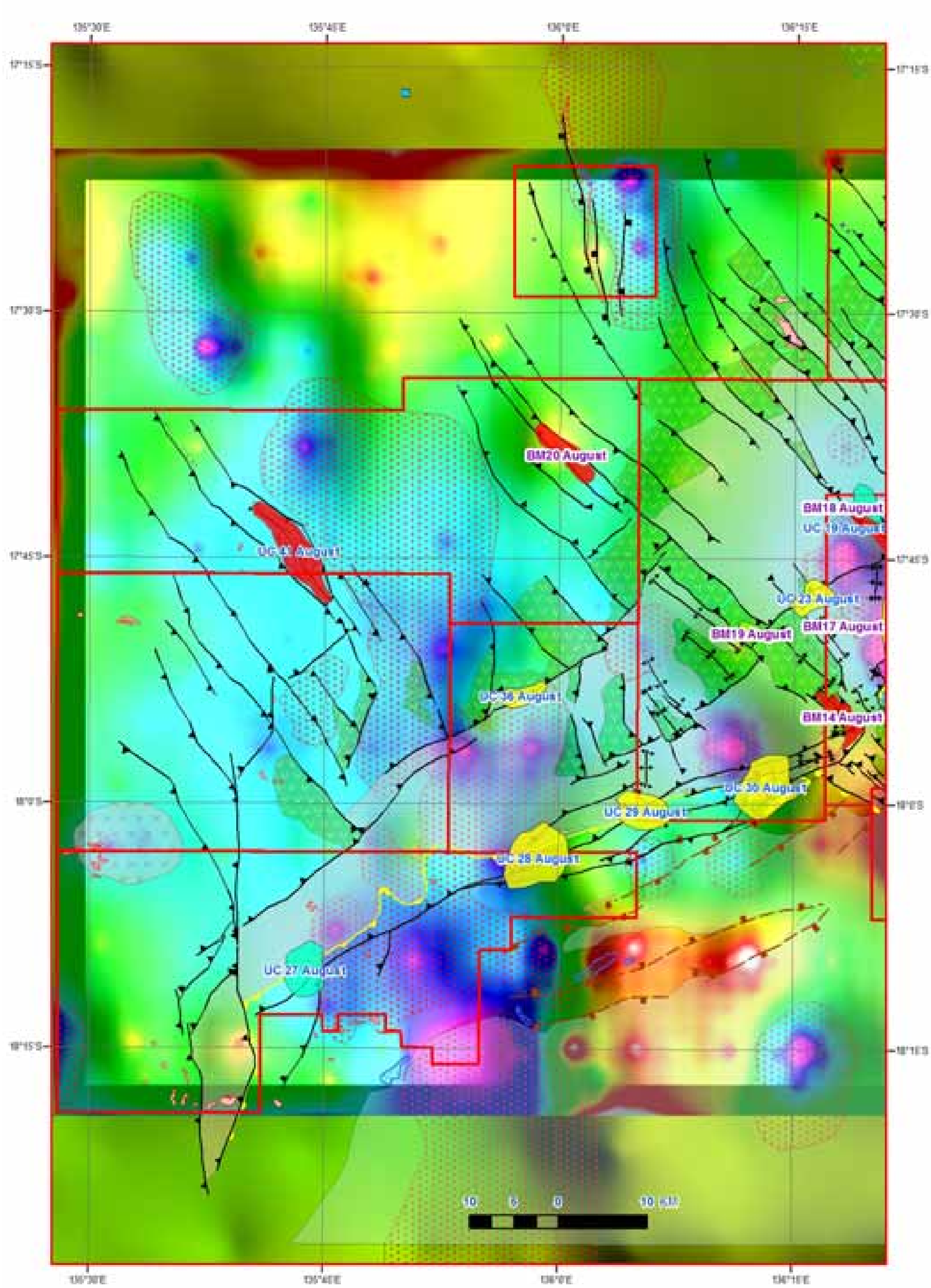

Figure 14 illustrates the Bouguer Gravity signature and the interpretation. Refer to the accompanying ARC VIEW project for a description of the treatment of the Bouguer Gravity data layers displayed here. The Bouguer Gravity data are from Geoscience Australia. The regional-scale N-trend of extensive Bouguer Gravity lows indicates a crustal scale break here. Targets UC27, 28, and 41 can be seen to have a very favourable Bouguer Gravity setting. The longer wavelength high associated with BM 14 and 20 may indicate a cryptic but significant NW-trending volcano-tectonic rift basin filled with mafic volcanic rocks, perhaps indicative of one of the foci of volcanism responsible for the enormous flood basalt field represented by the Seigal Volcanics. Bouguer Gravity worms and magnetic worms were used to refine inferred contacts of the granites and their country rock. **Abstract**. **Recommendations**.

Figure 15: Murphy Project: Interpretation: Detail: East

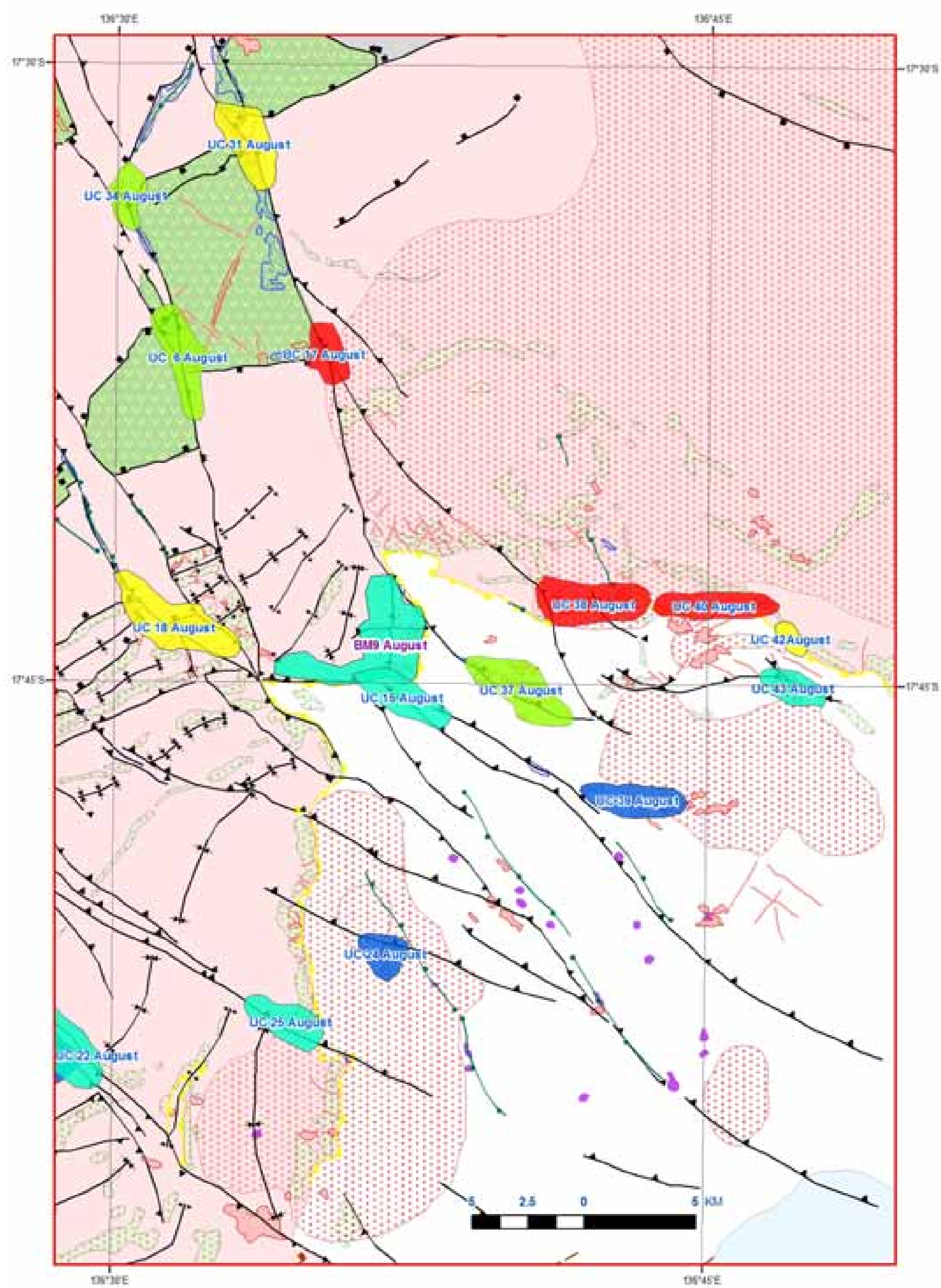

Figure 15 shows detail from the working interpretation and the targets in an E part of the Murphy Project. Pale grey is Neoproterozoic sedimentary rocks, pale pink is the Westmoreland Conglomerate, green the Seigal Volcanics, grey the McDermott Formation or fine-grained siliciclastic sediments and dolomite. Stippled polygons are concealed plutons of Nicholson Granite. Fine blue stippled polygons represent zones of magnetite-additive alteration; fine red stippled polygons represent zones of magnetite-depleted alteration. Short orange lines represent altered, magnetite-depleted dykes or joint sets or faults. Darker red, smaller polygons represent the highest amplitude and discrete U^2/Th anomalies. Small purple spots represent kimberlite pipes, most untested. The unconformity at the base of the Westmoreland Conglomerate is shown as a yellow line. **Abstract**. **Recommendations**. **Figure 5**.

Figure 16: Murphy Project: Interpretation: Detail: Central

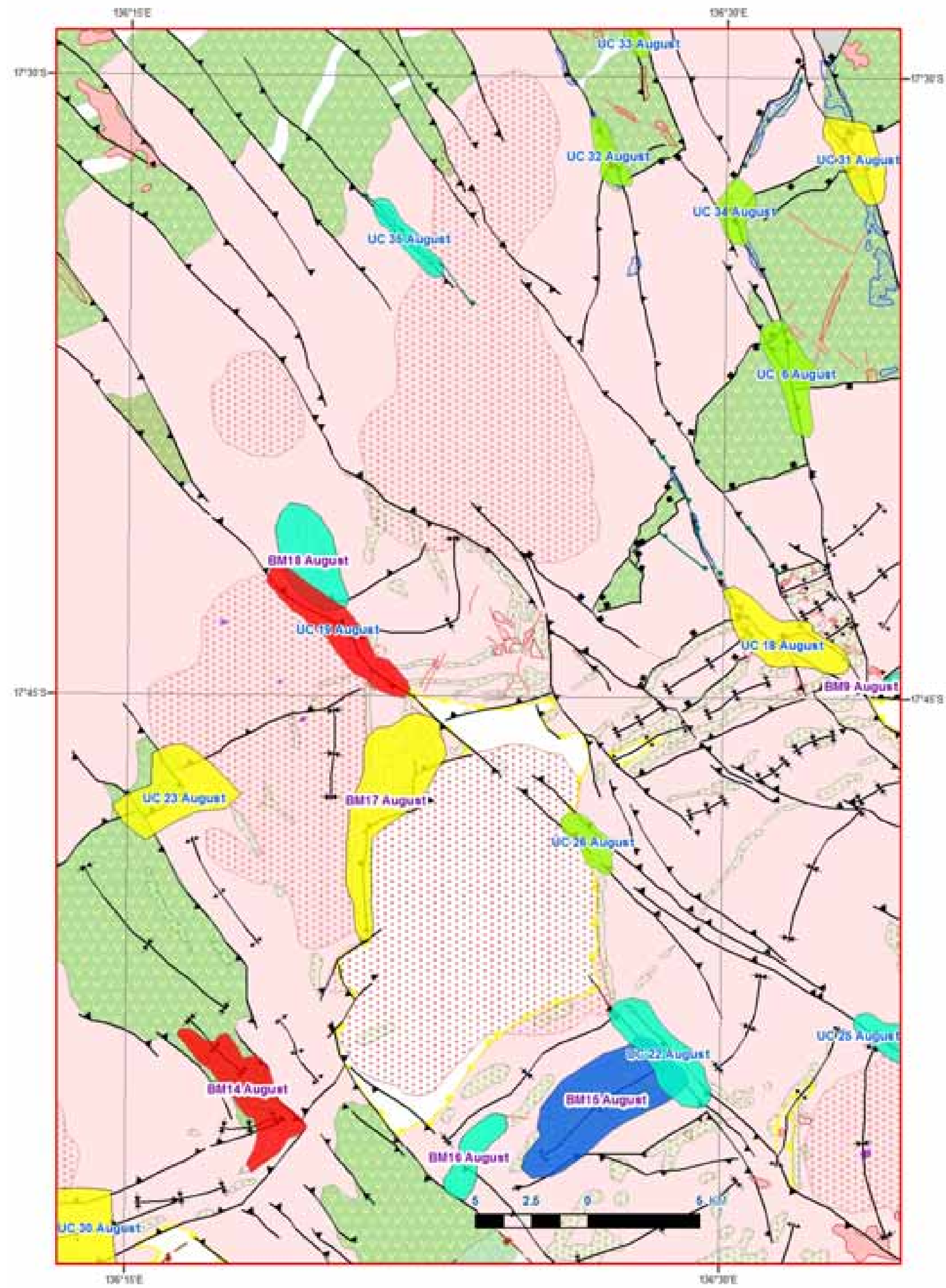

Figure 16 shows detail from the interpretation and the targets in the central part of the Murphy Project. Pale grey is Neoproterozoic sedimentary rocks, pink is the Westmoreland Conglomerate, green the Seigal Volcanics. Stippled polygons are concealed plutons of Nicholson Granite. Fine blue stippled polygons represent zones of magnetite-additive alteration; fine red stippled polygons represent zones of magnetite-depleted alteration. Short orange lines represent altered, magnetite-depleted dykes or joint sets or faults. Darker red, smaller polygons represent the highest amplitude and discrete U^2/Th anomalies. Small purple spots represent kimberlite pipes, all untested. The unconformity at the base of the Westmoreland Conglomerate is shown as a yellow line. **Abstract**. **Recommendations**.

Figure 17: Murphy Project: Interpretation: Detail: Central-W

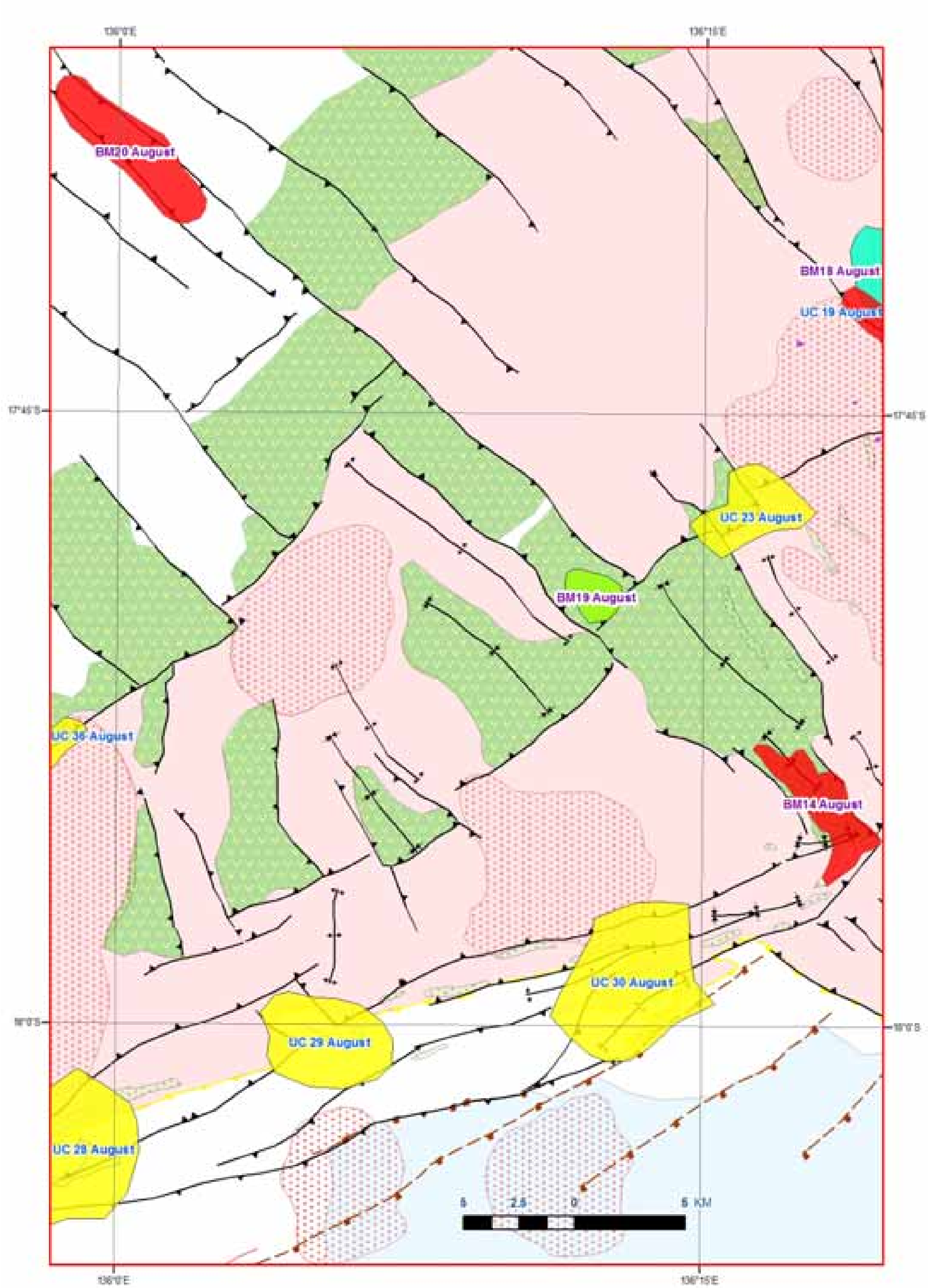

Figure 17 shows detail from the interpretation and the targets in the central-W part of the Murphy Project. Pale grey is Neoproterozoic sedimentary rocks, pink represents the Westmoreland Conglomerate, green the Seigal Volcanics. Stippled polygons are concealed plutons of Nicholson Granite. Fine blue stippled polygons represent zones of magnetite-additive alteration; fine red stippled polygons represent zones of magnetite-depleted alteration. Short orange lines represent altered, magnetite-depleted dykes or joint sets or faults. Darker red, smaller polygons represent the highest amplitude and discrete U^2/Th anomalies. Small purple spots are kimberlite pipes, all untested. The unconformity at the base of the Westmoreland Conglomerate is shown as a yellow line. **Abstract**. **Recommendations**.

Figure 18: Murphy Project: Interpretation: Detail: West

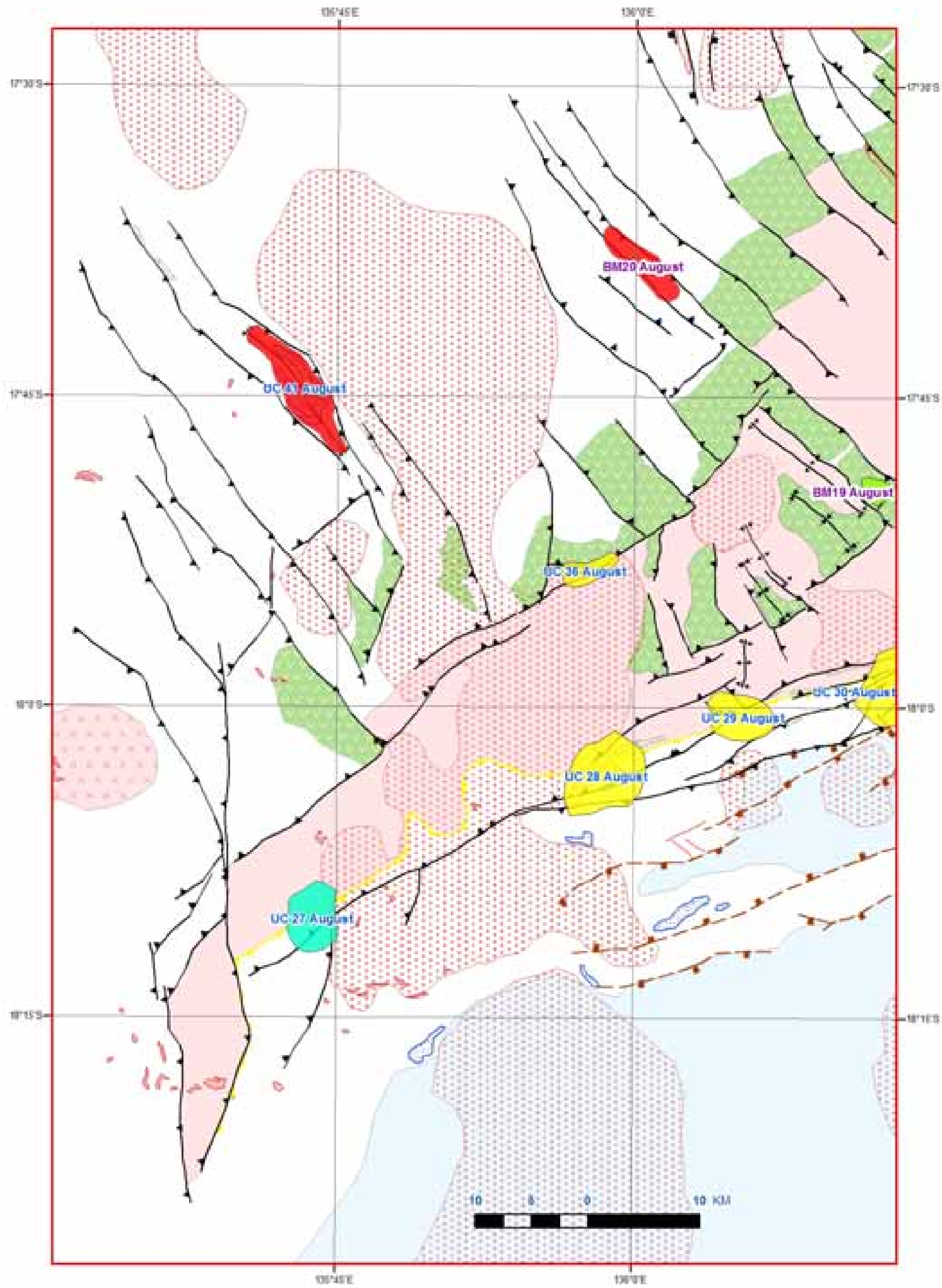

Figure 18 shows detail from the interpretation and the targets in the W part of the Murphy Project. Pale grey is Neoproterozoic sedimentary rocks, pink is the Westmoreland Conglomerate, green the Seigal Volcanics. Stippled polygons are concealed plutons of Nicholson Granite. Fine blue stippled polygons represent zones of magnetite-additive alteration; fine red stippled polygons represent zones of magnetite-depleted alteration. Short orange lines represent altered, magnetite-depleted dykes or joint sets or faults. Darker red, smaller irregular polygons represent the highest amplitude and discrete U^2/Th anomalies. The unconformity at the base of the Westmoreland Conglomerate is shown as a yellow line. Much of the interpretation in this area is very tentative, because of the magnetically-active cover of APB. **Abstract**. **Recommendations**.

Figure 19: Murphy Project: BG Worms: East

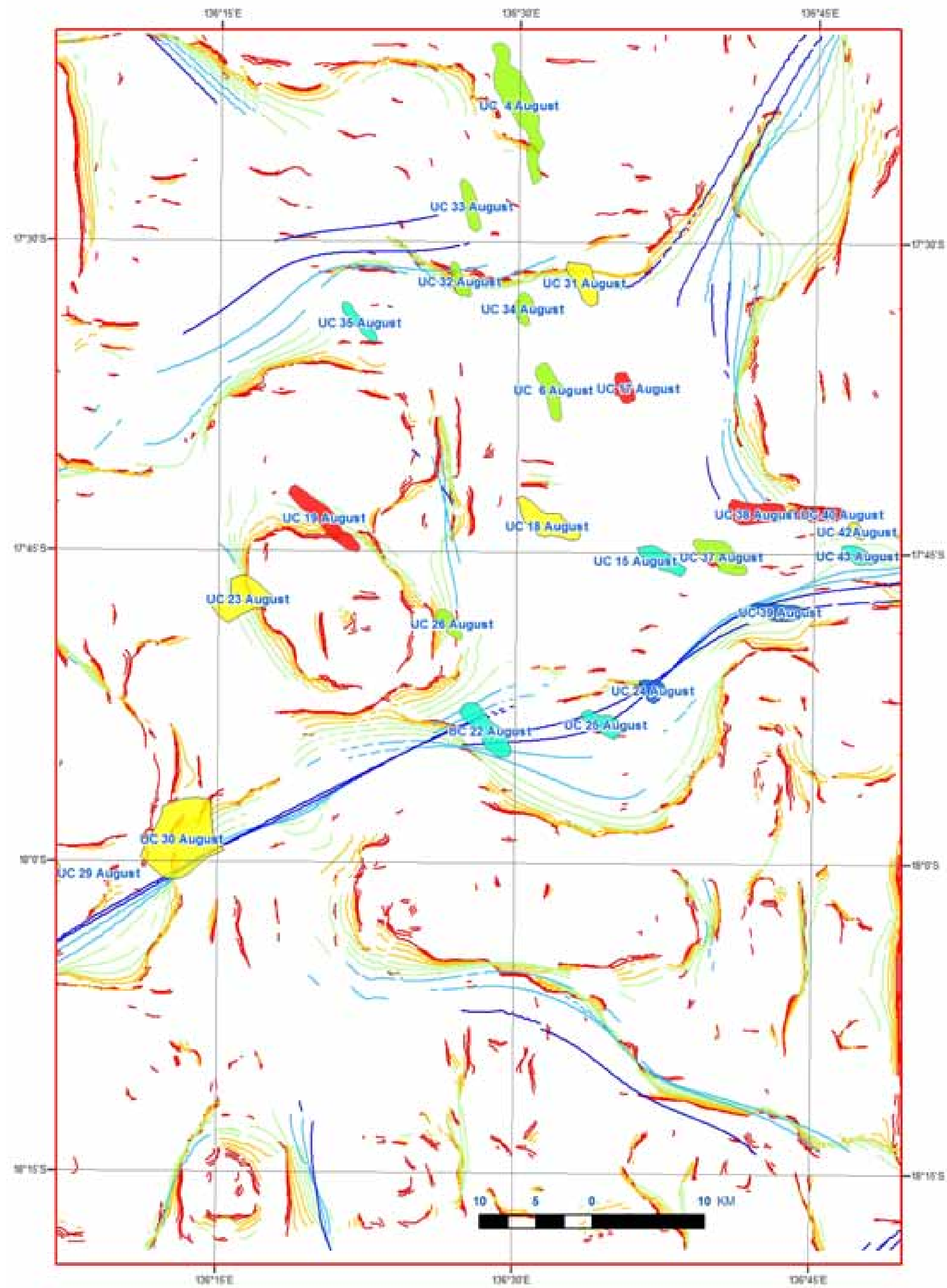

Figure 19 shows the Bouguer Gravity worms in the E sector of the Murphy Project. Red represents near-surface density-contrast contacts; blue represents deep crustal density contrast contacts. Interesting is the apparent lack of definition of the Emu Fault Zone in these data, but it must be emphasised that the Bouguer Gravity data in the area of the Murphy Project is sampled on ~ 11km station spacings, with consequent ill-defined positioning of the major crustal breaks. **Abstract**. **Recommendations**.

Figure 20: Murphy Project: BG Worms: West

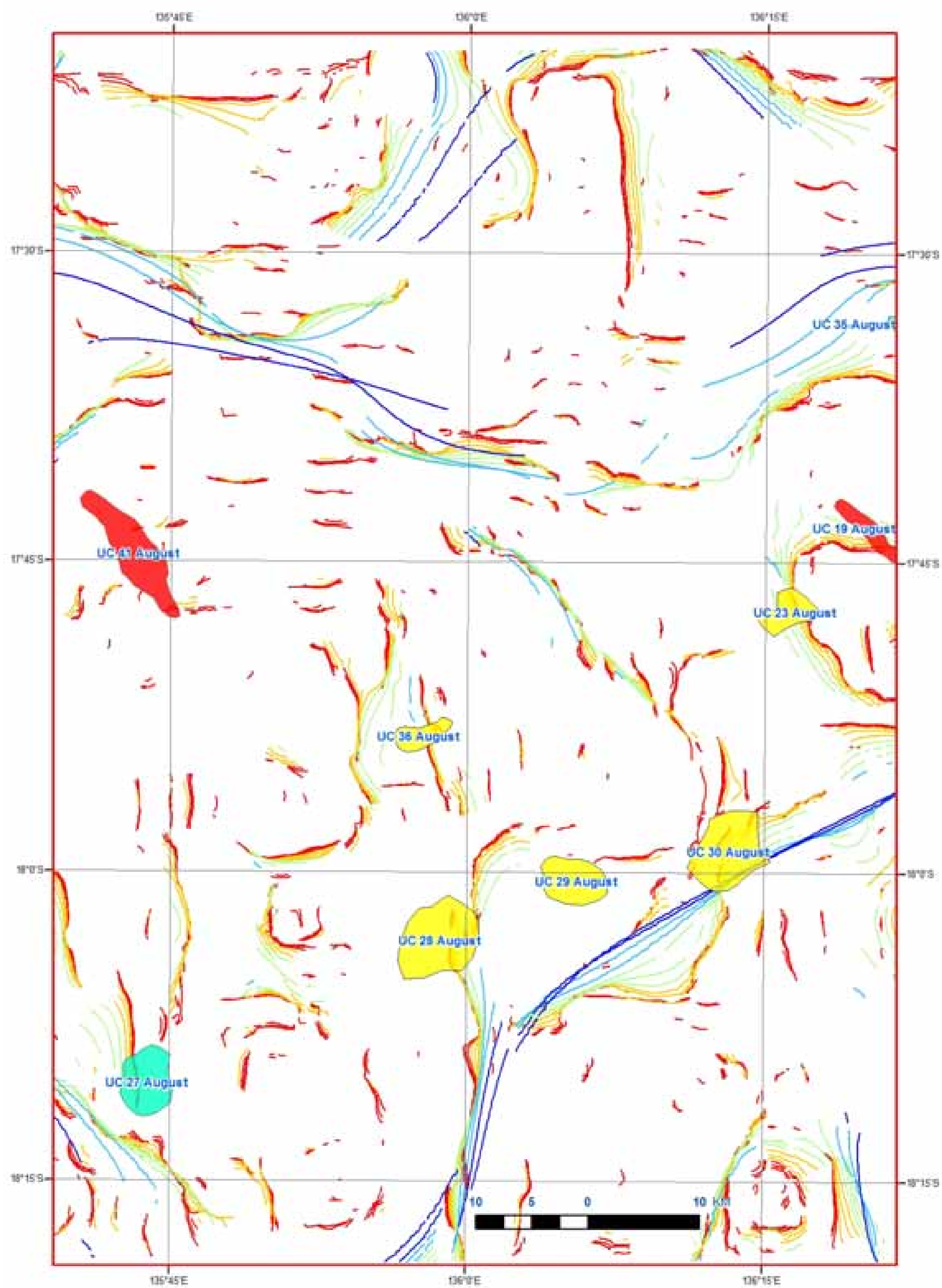

Figure 20 shows the Bouguer Gravity worms in the W sector of the Murphy Project. Red represents near-surface density-contrast contacts; blue represents deep crustal density contrast contacts. Interesting is the indication of a crustal-scale N-S break in the W part of the area shown here, but it must be emphasised that the Bouguer Gravity data in the area of the Murphy Project is sampled on ~ 11km station spacings, with consequent ill-defined positioning of the major crustal breaks. **Abstract**. **Recommendations**.

Figure 21: Murphy Project: Magnetic Worms: East

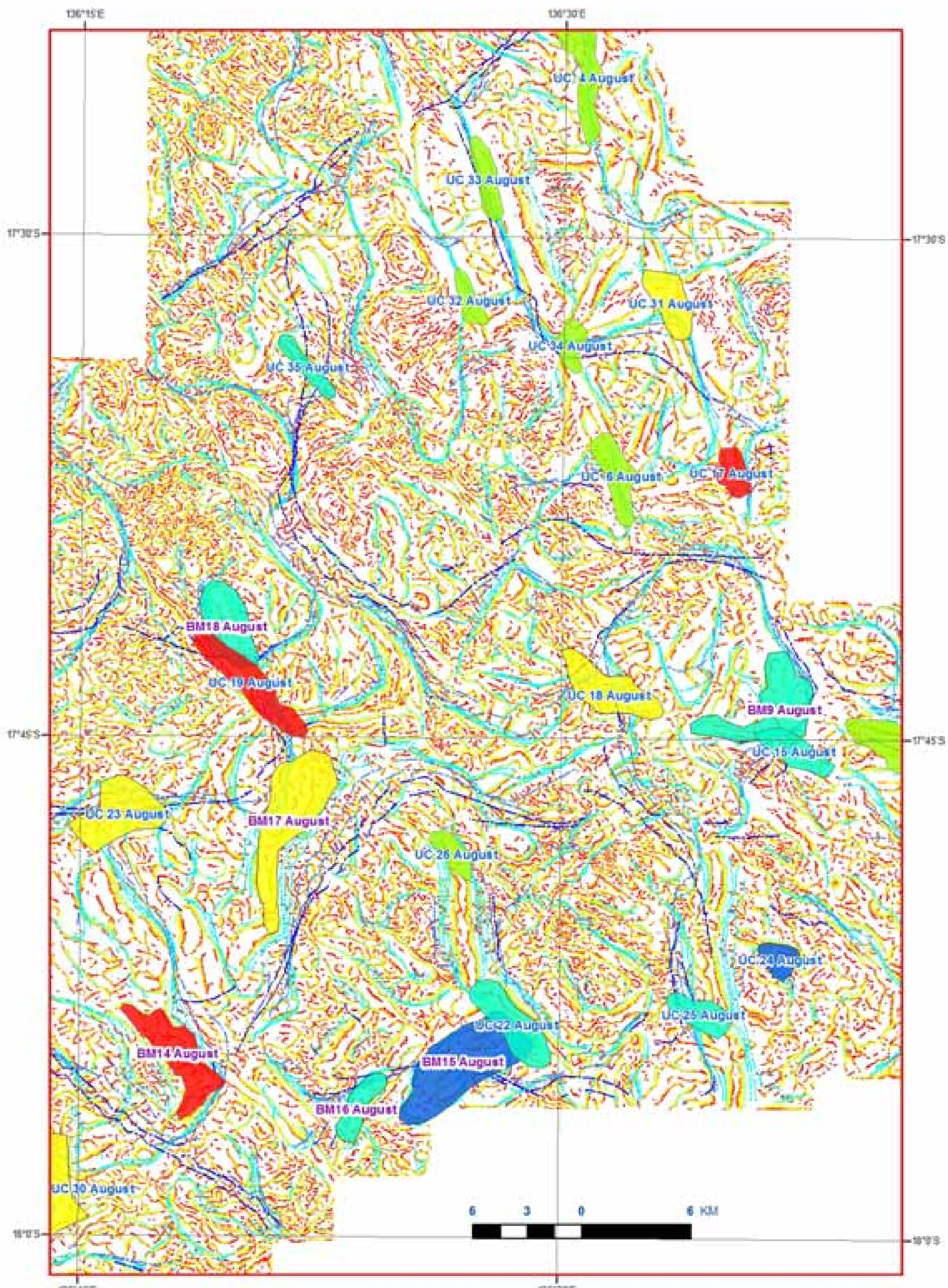

Figure 21 illustrates the worms defined from the aeromagnetic data, in the central-E sector of the Murphy Project. Evident are trends indicative of the Emu Fault Zone, and a set of NE- and NW-striking faults. The magnetic and gravity worms were used to define major faults and their likely dips, and contacts between major rock units. Where dip indications conflicted with geological inference, weight was placed on the dip information derived from the worm data. **Abstract**. **Recommendations**.

Figure 22: UC19: Illite Crystallinity-EqU3O8

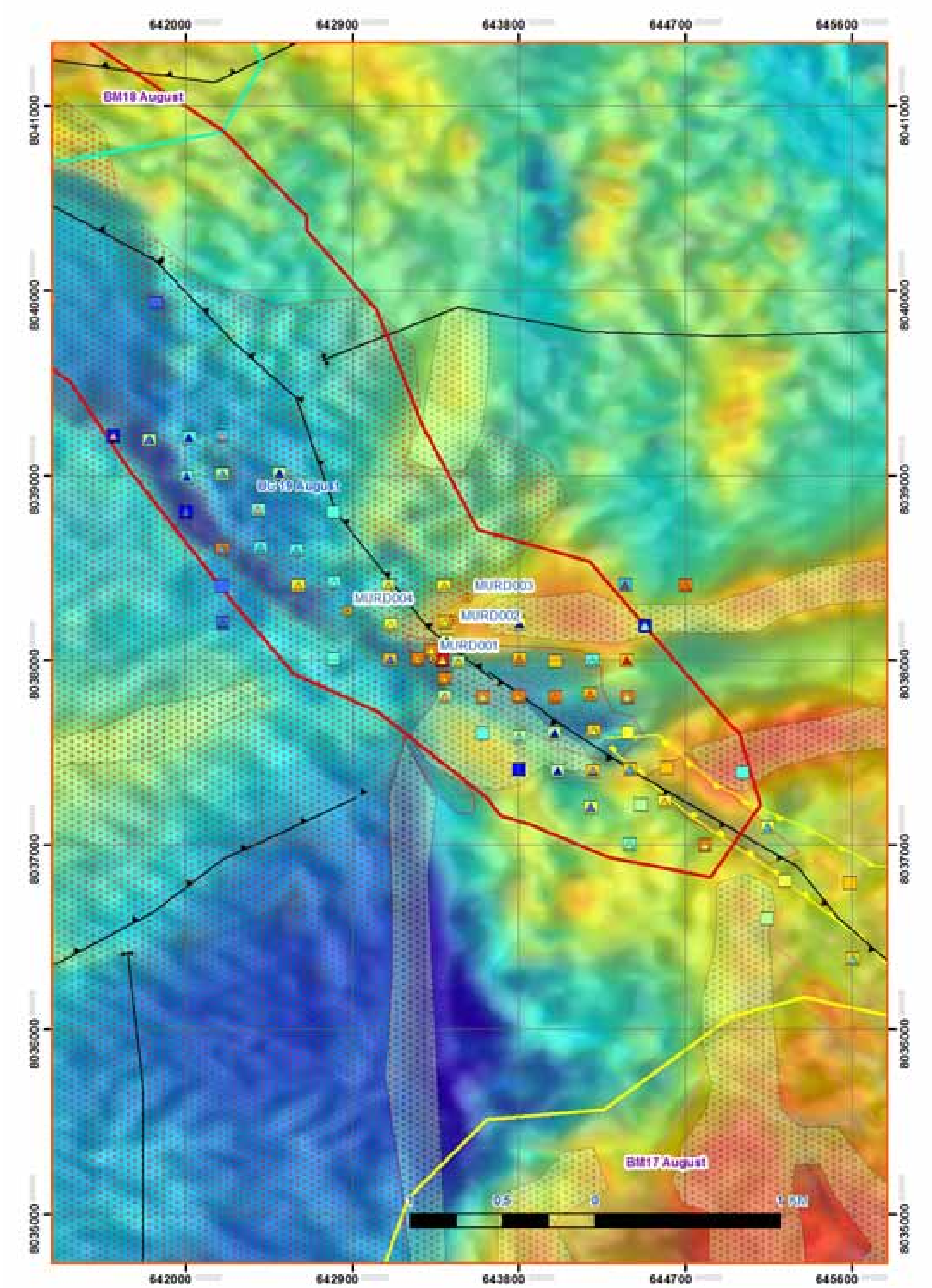

Figure 22 illustrates the relation between the highest gamma-equivalent uranium (squares) and illite crystallinity values (triangles) as determined by HYLOGGER in the RAB holes in UC19. Illite crystallinity values range from 0.21 (dark blue) to 1.33 (red). The gamma-equivalent U_3O_8 values (best in hole) range from 14ppm (dark blue) to 155ppm (red). There is a moderate correlation between the illite crystallinity values and the uranium gamma values, and, in particular, magnetically-dark zones, which may represent magnetite-destructive alteration. These data indicate that additional deeper drill holes be sited S of MURD002, along the mafic intrusive contacts and the fault zone. **Abstract**. **Recommendations**. **Observations and Cautions**

Figure 23: UC19: Illite Comp-EqU3O8

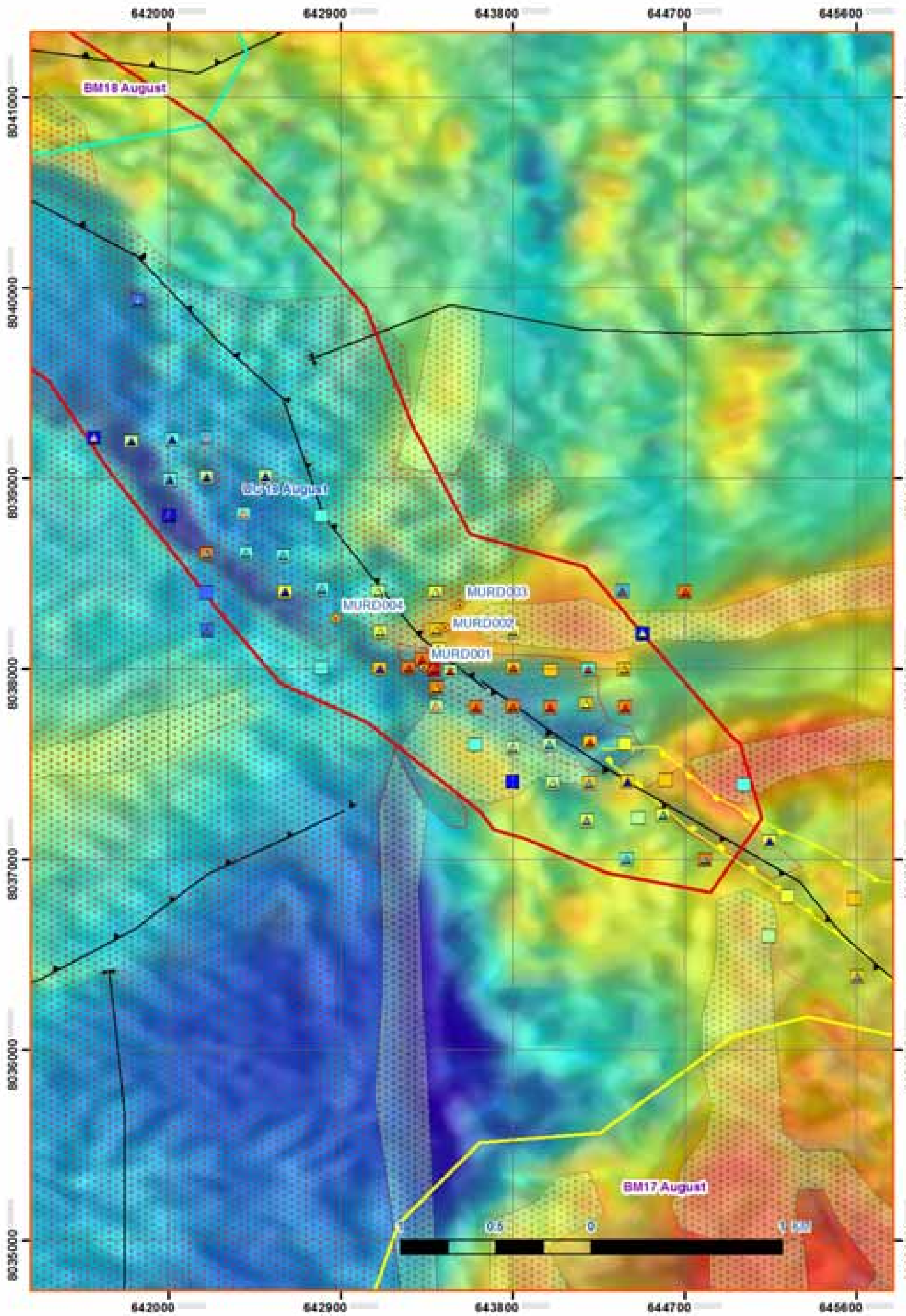

Figure 23 illustrates the relation between the highest gamma-equivalent uranium (squares) and illite average composition (triangles) as determined by HYLOGGER in the RAB holes in UC19. Illite composition values range from 2210 (dark blue) to 2201 (red). The gamma-equivalent U_3O_8 values (best in hole) range from 14ppm (dark blue) to 155ppm (red). There is an inverse moderate correlation between the illite composition values and the uranium gamma values, and, in particular, magnetically-dark zones, which may represent magnetite-destructive alteration. These data indicate that additional deeper drill holes be sited S of MURD002, along the mafic intrusive contacts and the fault zone. **Abstract**. **Recommendations**.

Figure 24: UC19: Indicator Mins-EqU3O8

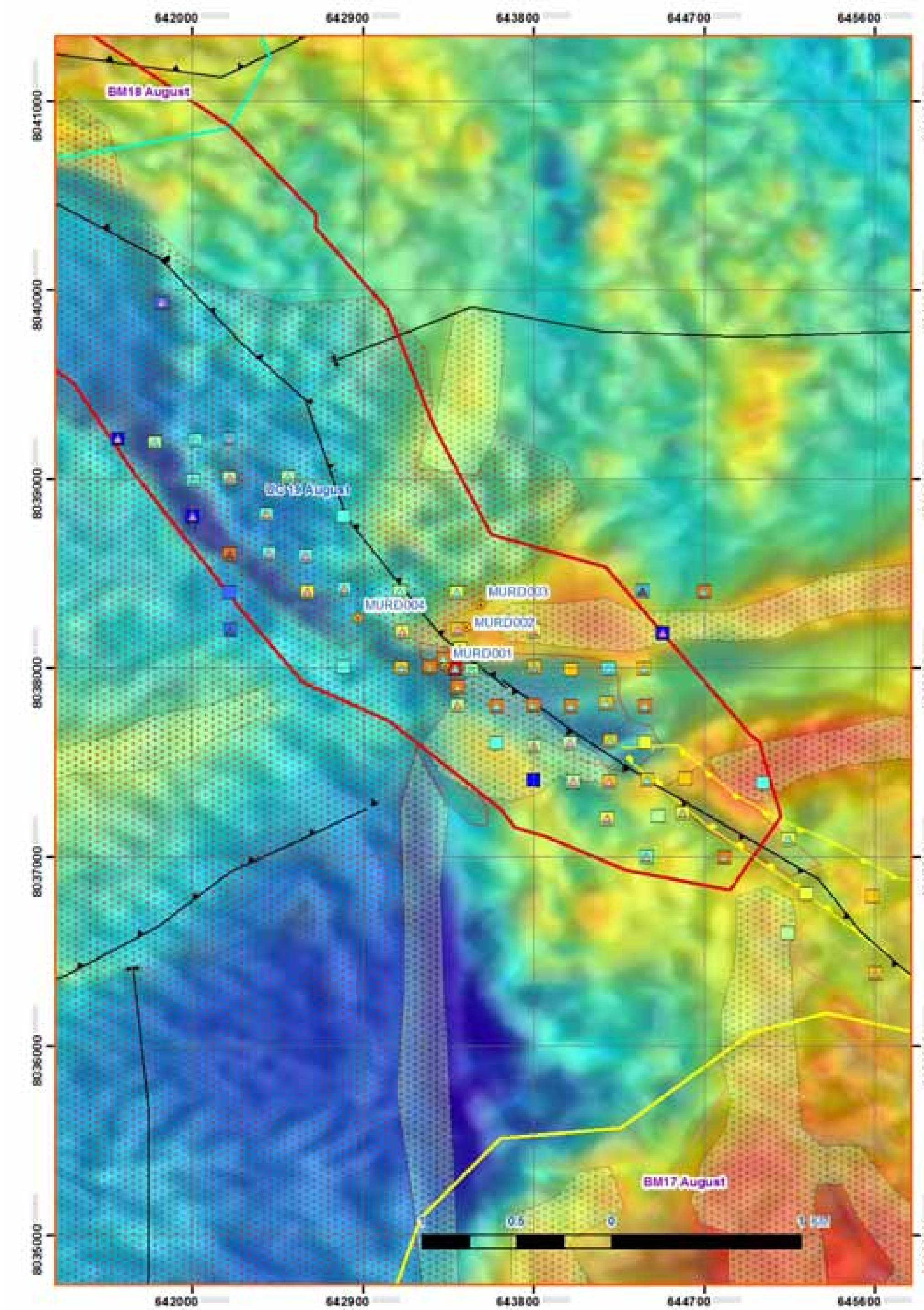

Figure 24 illustrates the relation between the highest gamma-equivalent uranium (squares) and the alteration indicator mineral assemblages (triangles) as determined by HYLOGGER in the RAB holes in UC19. Pale blue represents illite-carbonate, orange represents dickite, and pale purple represents illite-kaolin-carbonate. The gamma-equivalent U_3O_8 values (best in hole) range from 14ppm (dark blue) to 155ppm (red). There is a moderate correlation between the illite-carbonate occurrence and the uranium gamma values, and, between illite-carbonate and magnetically-dark zones, which may represent magnetite-destructive alteration (red stippled areas). Additional deeper drill holes should therefore be sited S of MURD002, along the mafic intrusive contacts and the fault zone. **Abstract**. **Recommendations.**

Figure 25: UC19: La-EqU3O8

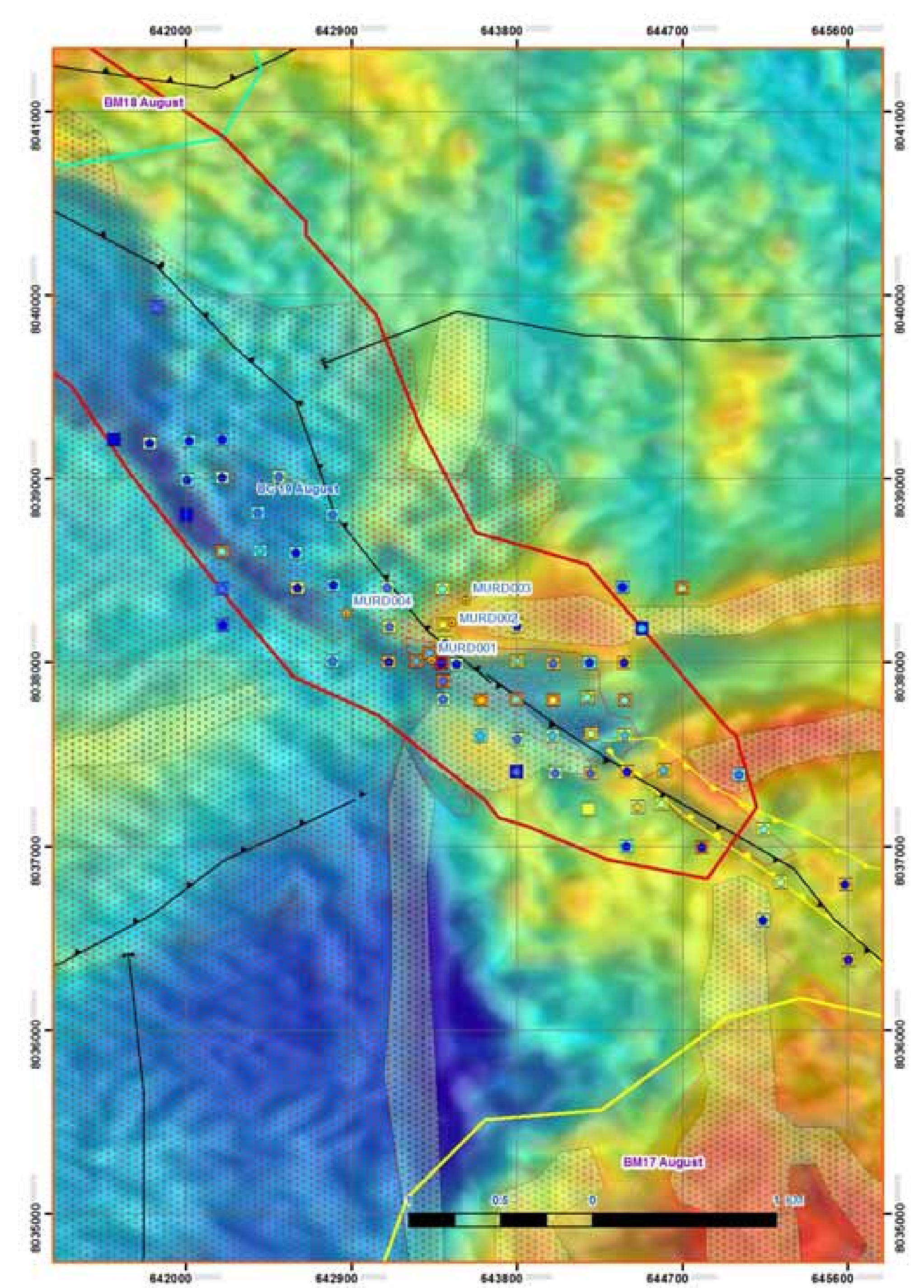

Figure 25 illustrates the relation between the highest gamma-equivalent uranium (squares) and the best-in-hole lanthanum values (pentagons) in the RAB drill holes in UC19. La values range between 10ppm (dark blue) to 280ppm (red). The gamma-equivalent U_3O_8 values (best in hole) range from 14ppm (dark blue) to 155ppm (red). There is a moderate correlation between the La values and the uranium gamma values in the area S of MURD001, but it is not developed between La and the magnetically-dark zones NW of here. The dark zones may represent magnetite-destructive alteration (red stippled areas). Additional deeper drill holes should therefore be sited S of MURD002, along the mafic intrusive contacts and the fault zone. **Abstract**. **Recommendations**.

Figure 26: UC19: Zn-EqU3O8

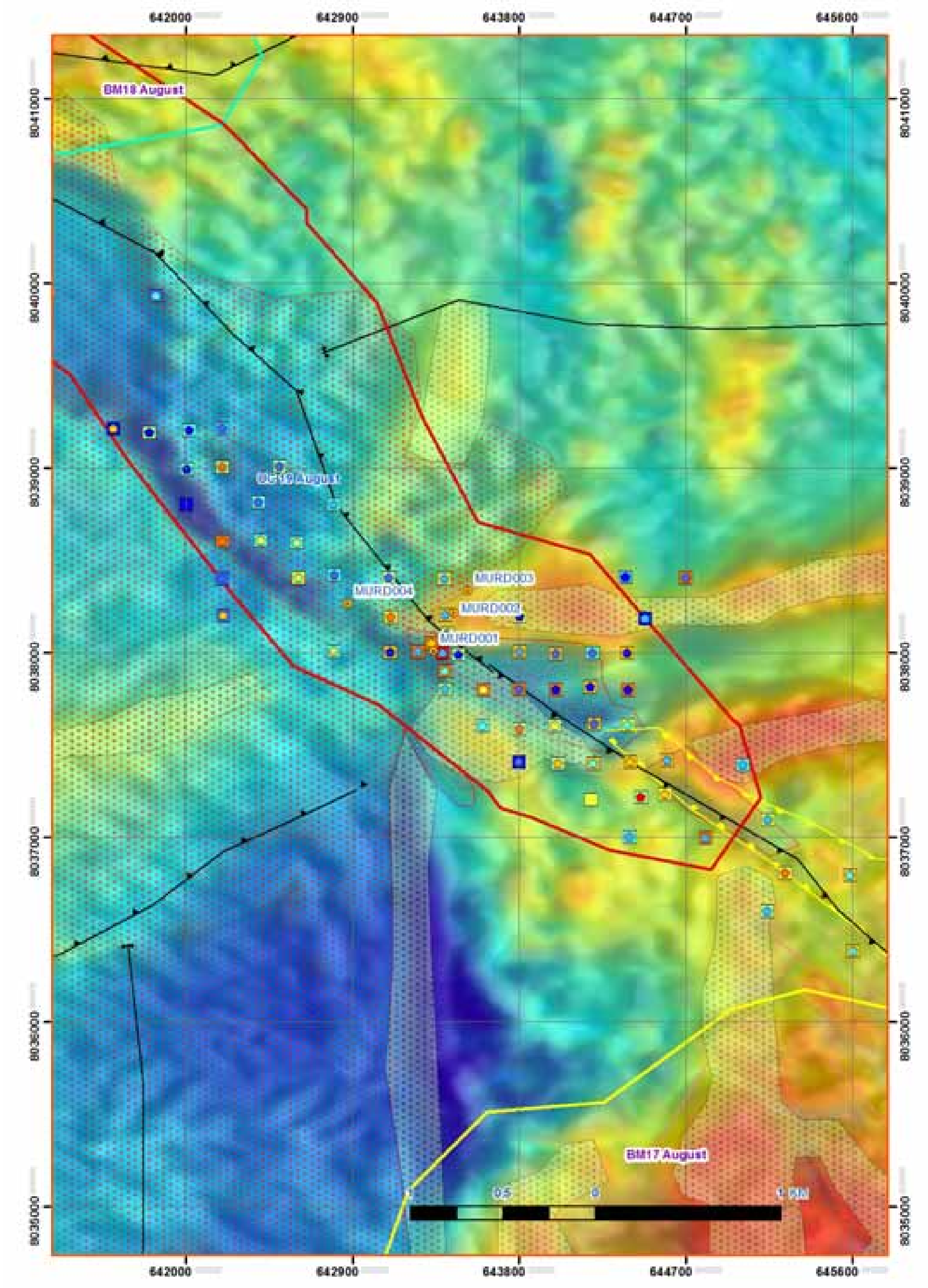

Figure 26 illustrates the relation between the highest gamma-equivalent uranium (squares) and the best-in-hole zinc values (pentagons) in the RAB drill holes in UC19. Zn values range between 3ppm (dark blue) to 2000ppm (red). The gamma-equivalent U_3O_8 values (best in hole) range from 14ppm (dark blue) to 155ppm (red). There is poorly developed inverse correlation between the Zn values and the uranium gamma values in the area S of MURD001, but such a correlation is not developed to the NW of here. The variation in Zn values indicates that additional deeper drill holes should therefore be sited S of MURD002, but on the E side of the fault, along the mafic intrusive contacts and the fault zone. **Abstract**. **Recommendations**.

Figure 27: UC19: Cu-EqU3O8

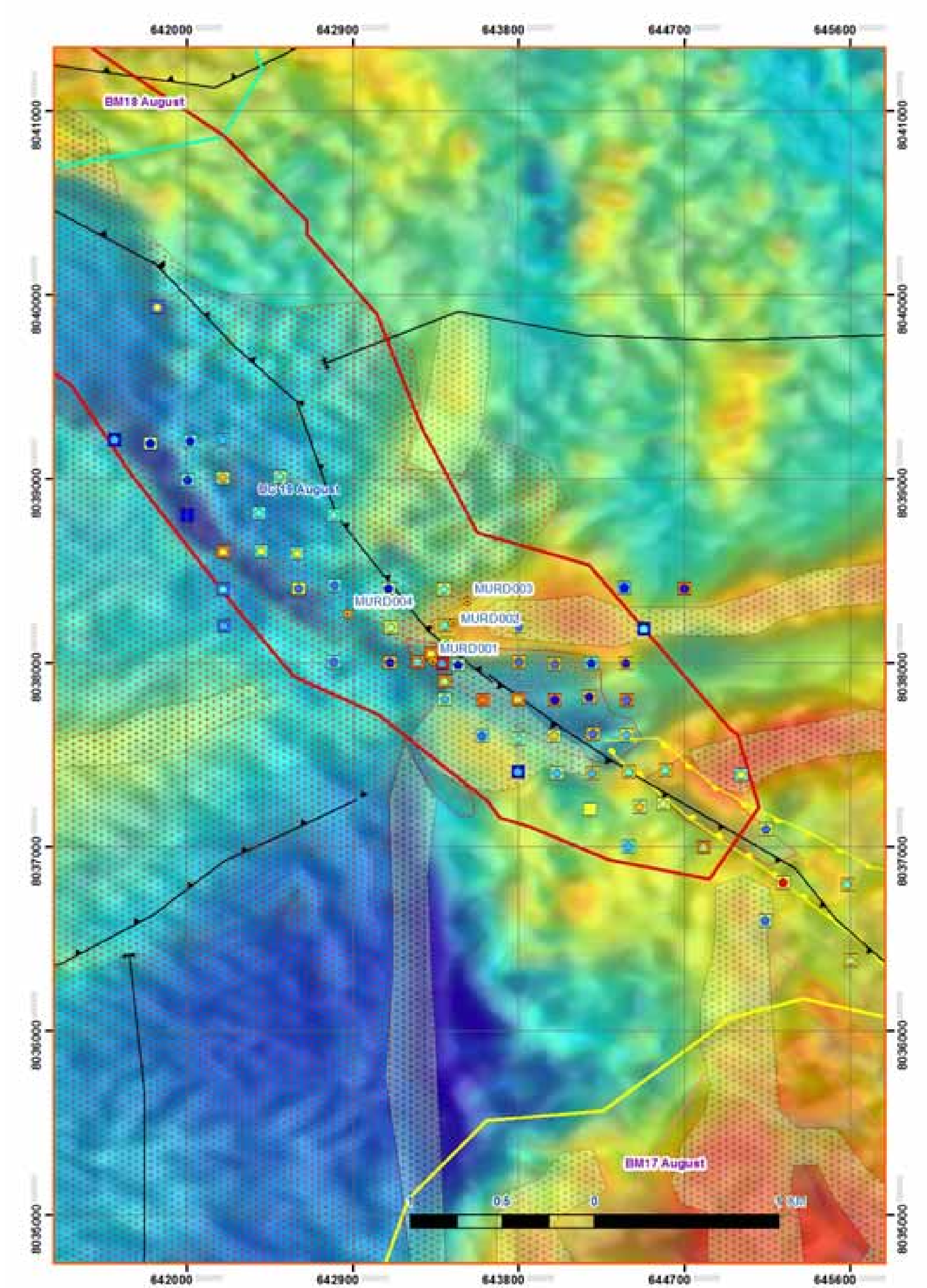

Figure 27 illustrates the relation between the highest gamma-equivalent uranium (squares) and the best-in-hole copper values (pentagons) in the RAB drill holes in UC19. Zn values range between 1ppm (dark blue) to 380ppm (red). The gamma-equivalent U_3O_8 values (best in hole) range from 14ppm (dark blue) to 155ppm (red). There is poorly developed inverse correlation between the Cu values and the uranium gamma values in the area S of MURD001, but such a correlation is not developed to the NW of here. The variation in Cu values indicates that additional deeper drill holes should therefore be sited S of MURD002, but on the E side of the fault, along the mafic intrusive contacts and the fault zone. **Abstract**. **Recommendations**. **Observations and Cautions**

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Saturday, 29 August 2009