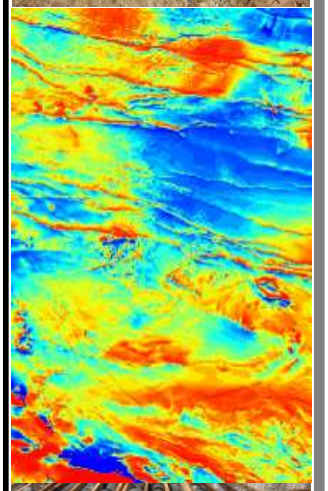

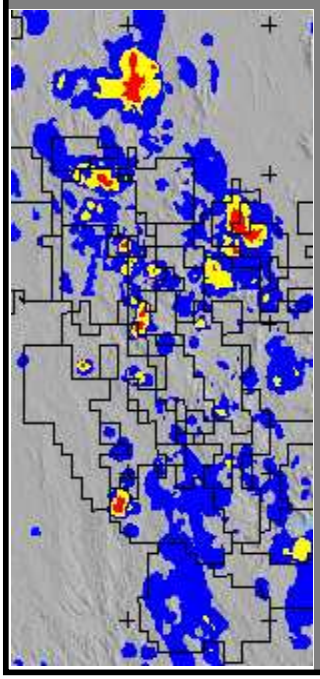

Mineral Prospectivity Modelling 2010

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MINERAL PROSPECTIVITY MODELLING

Predictive Modelling for Mineral Exploration

Most exploration targeting is currently preformed by searching prospect information from mineral occurrence databases or background knowledge of those involved. While this type of analysis has been effective in the past, many areas have now been well explored and this type of approach will not find new or buried mineral deposits. Effective targeting can only be done if all data are compiled and integrated in a way that matches the mineralisation model being sought i.e. attaching knowledge to data.

Kenex's area of expertise is at the knowledge end of the "Information Value Chain". We make the connection between data, information, processes, and the ideas of people, to deliver innovative knowledge-based business solutions. We use predictive modelling techniques to ascertain the highest quality sites for mineral exploration.

Our modelling is one of the most advanced exploration targeting tools in the industry because:

- It allows an explorer to combine spatial data and knowledge in a way to manage and target more effectively.
- Modelling can be a non-bias view of data which in some cases is an important process in moving forward and away from preconceptions.
- Takes advantage of the wealth of digital data available in the industry and deals with data overload issues that plague many explorers.
- Save time and money by putting resources into the most likely places first time and undertake value/risk assessment of assets.

"Spatial data modelling allows large scale analysis of data for scoping studies"

MINERAL PROSPECTIVITY MODELLING

About Kenex and the Modelling

Kenex is a company that provides targeting, management and GIS (Geographic Information Systems) services for the mineral exploration, renewable energy and environmental industries in Australia, New Zealand and globally. Adopting the latest GIS technologies, Kenex have undertaken predictive modelling to identify prospective areas for potential mineral deposits, wind farm locations and wildlife habitats. Our other services include Exploration and Industry advice, Tenement Management, Data Management and Acquisition, Fund Raising and Business Development and Exploration Project Management.

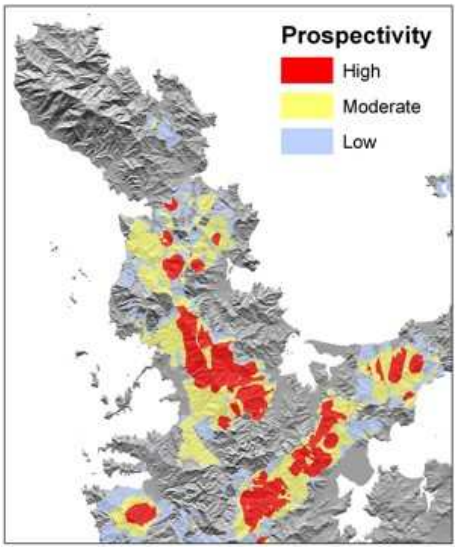
Kenex predictive models have helped target highly prospective ground around the globe and have helped companies in Australia and New Zealand raise exploration capital from market based investors. We are able to assist in helping acquire highly prospective land – often before your competitors know it exists, tell you which data types are the most useful to collect in your exploration areas and help prioritise work programs based on the prospectivity of your tenements. Kenex can really add value to your exploration and allow you to focus your money and time on the most prospective land.

Mineral Prospectivity Modelling

Mineral prospectivity modelling is all about making intelligent exploration decisions based on the wealth of spatial data available to explorers and finding new mineral deposits using exploration models. Prospectivity modelling allows you to statistically assess the potential for a mineral deposit based on geology, geochemistry, and geophysics. Much of these data are freely available from Geological Surveys and Mines Departments and in recent times intelligent explorers have been using these resources for more than making maps. They've been adding value to the data by using predictive modelling to find the most prospective ground for new mineral resources.

What do you get out of a prospectivity model?

Prospectivity modelling produces a map showing those areas that are most likely to contain economic concentrations of the metal or mineral you're exploring for (e.g. the map below shows those areas most likely to host epithermal gold mineralisation in the Coromandel region, New Zealand). These types of maps can be used in GIS software to show where the most prospective areas are relative to tenements, existing mine sites, historical exploration, or processing facilities. The map produced from the modelling software is commonly called a predictive map or posterior probability map because it shows the statistical probability of the metal or mineral of interest occurring in a predetermined area. For statistical reasons geologists prefer to interpret the probabilities as a relative measure of favourability by ranking the data (e.g. high, moderate, low, or poor classifications in the example map for the Coromandel). This classified and ranked map can then be used by the explorer to target exploration in highly prospective ground and place lesser importance or even relinquish land that is not prospective. The spatial data modelling gives the explorer sound statistical information for financial and tenement management decision making.



MINERAL PROSPECTIVITY MODELLING

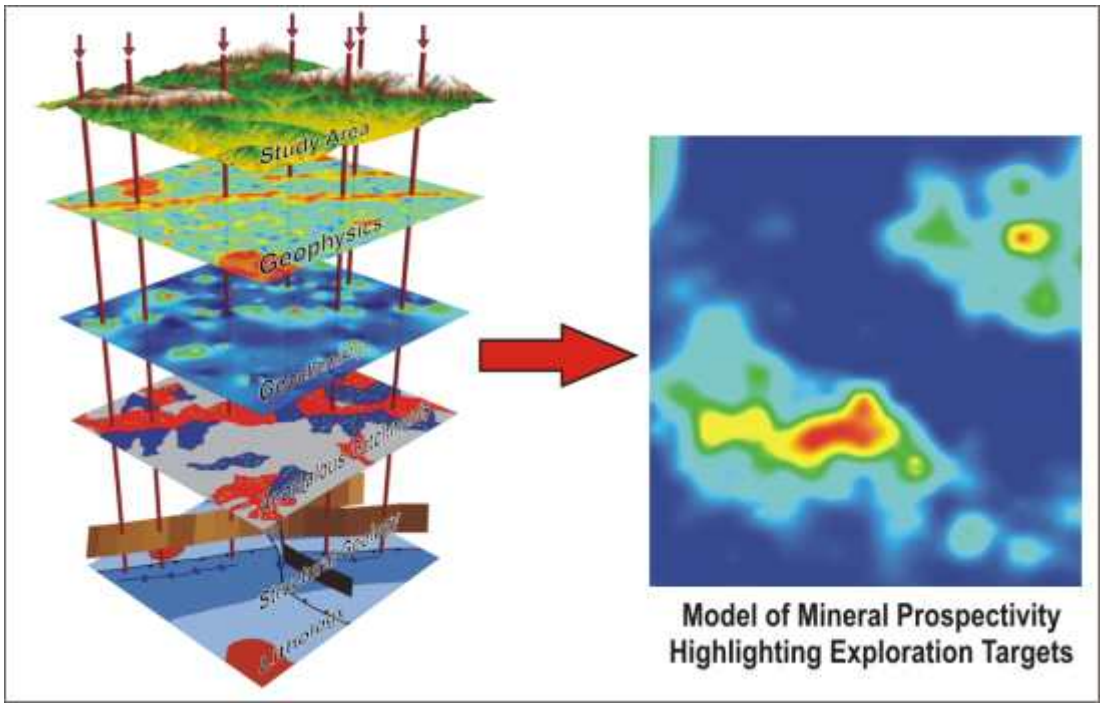
Mineral Prospectivity Modelling

How and why does the model work?

Spatial data modelling uses layers of geological, geochemical, or geophysical data variables derived from the exploration mineralisation model being used by the exploration company to target their metal or mineral of interest (e.g. lithology, geochemistry, faults) and combines those variables according to their importance as predictors of mineralisation to create a probability map.

The probability of a deposit occurring in a particular theme can be applied to each variable by using a subjective expert opinion or using a more objective statistically calculated value by using the Weights of Evidence statistical technique. For example, if most of the gold mines in a study area occur along SE trending faults in granitic rocks, the Weights of Evidence probabilities for these variables would be much higher than those for NE trending faults in sandstone rocks. These are known as positive correlations and are predictors of the presence of mineralisation. The Weights of Evidence technique also calculates the probability of absence or negative correlation of a variable which also provides important information on the prospectivity of an area. For example, if you know that gold mines in your study area never occur in marble or along folds because of this negative correlation, you can exclude this land from additional data collection and reduce your cost of exploration significantly.

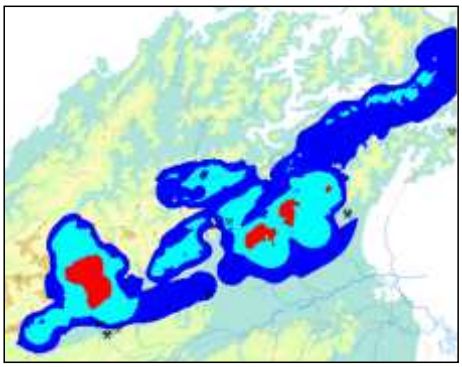
When all the data variables have had probabilities assigned to them they are combined into one map (see illustration below) using the probabilities to weight the relative importance of the variables. From our example above, the areas of high prospectivity in the model would be where SE trending faults and granites occur together, areas of lower prospectivity would be where just one of the positive predictive variables occurred. Prospectivity values would be lower in areas that contained either of the negative predictive variables and the areas of lowest prospectivity would be where both negative predictive variables (marble and folds) were present. Our example here was simple as it only contains four predictive variables (granite, marble, faults, and folds). In reality nature is much more complex and dozens of themes are used to create a prospectivity map.



MINERAL PROSPECTIVITY MODELLING

Mineral Prospectivity Modelling

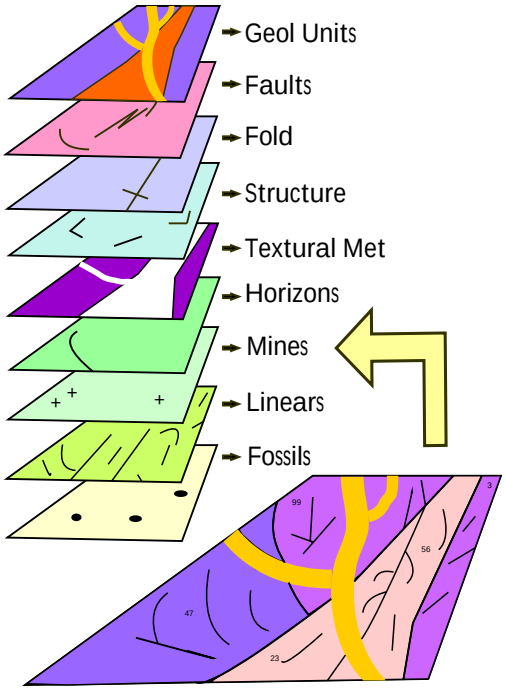
Spatial data modelling is one of the best techniques to assess the mineral prospectivity of land as it allows the combination of all the important predictive variables related to your mineral deposit model into one map. It is more powerful than just using single predictive variables such as rock chip geochemistry contour maps or geological maps. Spatial data modelling also has the added advantage of taking human bias out of the decision making process.

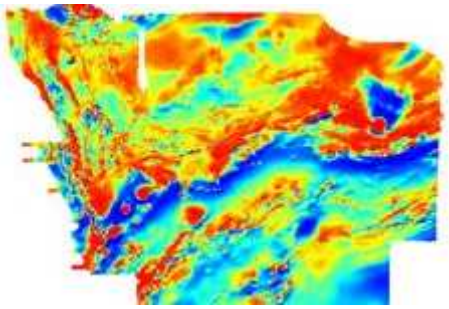


The probability map is one of the best ways to assess the prospectivity of land as it combines several different themes related to your mineral deposit into one map. It's more powerful than a rock chip geochemistry contour map or a geological map used on their own and allows you to see areas of land that were not previously thought of as potential deposit areas. The model is also based on statistics, this means that it is not bias to previous ideas or current exploration trends. It is based on what's been measured on the ground and which of these measurements are most related to your mineralisation model (both positive and negative correlating themes).

What goes into a prospectivity model?

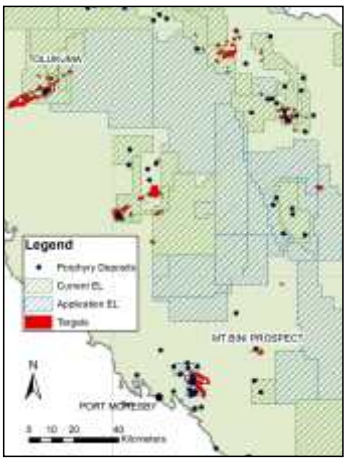
Although the recipe for the formation of an ore body can be simplified to geology, geochemistry, and geophysics the combination of predictive variables that can be created from these base data are many and varied. The predictive themes are chosen either statistically by using the Weights of Evidence technique or by expert opinion. In either case the predictive themes have to have some relationship to the processes that formed the ore deposit in question. A variety of themes may be extracted from a geological map (see illustration below). Themes derived from interpretation of geophysical data are excellent data sources for modelling as they provide continuous data coverage, minimising problems associated with missing data. Another important data source comes from point geochemical data, which have to be analysed for anomalous geochemical associations before they can be used in spatial data modelling. Most of these data are from historical exploration and are freely available from state and national Geological Surveys. The data are now often available in a digital format ready for use in a GIS and spatial model.





MINERAL PROSPECTIVITY MODELLING

Using the Modelling Results



Prospectivity maps have many more uses than for display and map production. You can use the probability data from the model to focus your exploration time and money on highly prospective areas, acquire or relinquish new tenements based on their prospectivity, or even use the modelling results to raise capital. Prospectivity modelling can also be used to manage your exploration programs. The model allows you to work out the new and or more detailed data that needs to be collected over the prospective areas and the model can be rerun to assess the effectiveness of the new data in enhancing the prospectivity of the area being tested. For example, an explorer may identify from modelling of historical data a region of a likely gold deposit based on themes from geological mapping, rock chip geochemistry and stream sediment geochemistry. They'll then raise funds from investors using the model to show them where and why there's likely to be gold. With this money they can go out and collect soil samples and geophysical data and re-run the model before deciding on areas to consider for their advanced field work or drilling programs.

Spatial Modelling Techniques

The simplest type of predictive spatial analysis is where maps, with the chosen input variable(s) represented by a series of integer values, are combined together using arithmetic operators. This type of analysis takes no account of the relative importance of the variables being used and is based on expert opinion.

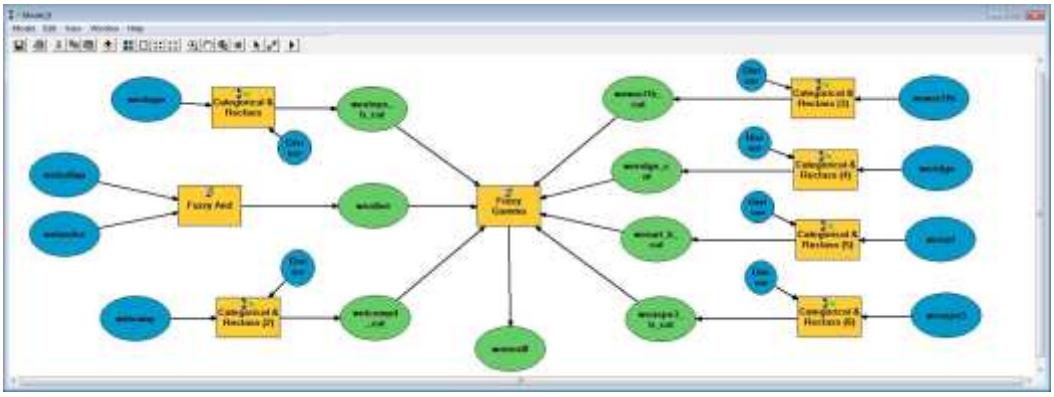
Fuzzy Logic techniques address the problem of the relative importance of data being used, but this technique still relies on expert opinion to derive weights that rank the relative importance of the variable for the map combination.

Weights of Evidence, in contrast uses statistical analysis of the map layers being used with a training dataset to make less subjective decisions on how the map layers in any model are combined.

Neural network techniques have been developed to mimic the thought process of the human brain and are entirely data driven techniques that are difficult to interpret.

More details of the particular techniques and their application are given in our website:

www.kenex.co.nz/predictive



Example of a Fuzzy Logic Decision Tree

MINERAL PROSPECTIVITY MODELLING

Examples of Modelling Success

Auzex Resources Ltd - Granite Related Gold Mineralisation

Auzex Resources has successfully acquired tenements throughout New Zealand and Australia for granite related gold, molybdenum, tungsten and other associated metals using an international scale prospectivity model developed by Kenex.

This highly aggressive acquisition of land in 2005 has lead to immediate success for the new exploration company, including a significant molybdenum project in Kingsgate (NSW, Australia), successful drilling at Lyndbrook (Nth Queensland, Australia) where economic gold, tungsten and molybdenum have been found, and the identification of a significant tungsten resource near Reefton (New Zealand).

After recent greenfield discoveries of Gold at Seven Hills and West Tinaroo (Nth Queensland, Australia), Auzex Resources paid tribute to the prospectivity modelling work by Kenex and wrote the following in an ASX release:

"The Seven Hills discovery is further evidence that the new prospectivity modelling techniques used by Auzex in combination with our extensive database throughout eastern Australia and New Zealand are providing the Company with a significant competitive advantage in our exploration for granite related mineral systems."

MINERAL PROSPECTIVITY MODELLING

Al Fairuz Mining - Volcanogenic Massive Sulphide Cu-Au Mineralisation in Oman

The Sohar Region in northern Oman has a history of copper mining dating back to the Bronze Age in volcanic rocks belonging to the Semail Ophiolite. More than 150 massive sulphide prospects have been discovered along the 500km strike length of the Semail Ophiolite.

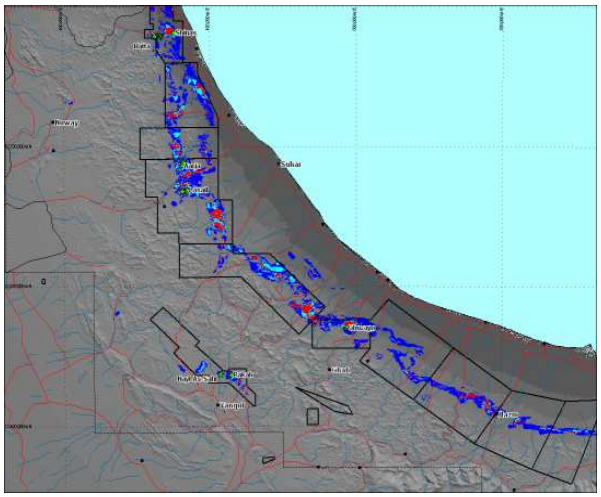
Local company Al Fairuz Mining was awarded a large tenement in the central part of the ophiolite belt and sought an assessment of the prospectivity of the tenement area and the potential for the discovery of economic copper and gold mineralisation. A GIS was compiled of the relevant geological, geochemical and geophysical data over the Semail Ophiolite Belt, in the process covering the tenement awarded to Al Fairuz Mining

The mineral system approach was used to constrain the predictive maps used in the modelling. Weights of Evidence spatial modelling was carried out on these maps to determine the most important variables for predicting VMS copper-gold mineralisation. These variables included lithology, structure, geochemistry, geophysics, mineralisation and alteration.

Typically, most exploration targeting had been undertaken by using single predictive maps such as magnetic or TEM data. Effective targeting is however best done if all relevant data are compiled and integrated in a way that matches the mineral system model being used, and combined into a single predictive map.

The spatial modelling by Kenex successfully modelled the probability of VMS copper-gold mineralisation in the Northern Semail Ophiolite Belt for each 20m grid cell in the study area. The modelling identified the excellent potential for new deposits of VMS copper gold mineralisation similar to those already known in the area.

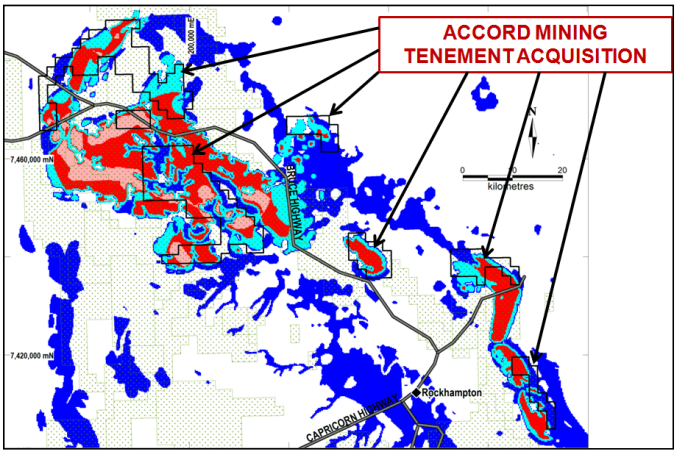
The prospectivity model completed by Kenex identified thirteen high priority targets within the tenement held by Al Fairuz Mining. Of these only five were prospects that had been identified by previous exploration. The modelling has prioritised the targets and identified the exploration approach required to advance the understanding of each target.



MINERAL PROSPECTIVITY MODELLING

Granite-Related Nickel Deposits throughout Eastern Australia – Accord Mining Ltd

Accord Mining (Pty) Ltd acquired six tenements over prospective areas within the Rockhampton region for follow up exploration based on the results of spatial modelling for granite-related nickel deposits in eastern Australia and New Zealand completed by Kenex.



Granite-related nickel skarn mineralisation has recently been recognised as a new style of deposit associated with the remobilisation of nickel from ultramafic host rocks during granite intrusion. The Avebury nickel deposit in Tasmania is an example of this new style of nickel mineralisation.

Kenex has used spatial modelling techniques, in particular weights of evidence modelling, to determine potential locations of granite-related nickel skarn mineralisation throughout eastern Australia. The weights of evidence technique utilised expert knowledge about the mineral deposit system, uses databases of geological information that include geological mapping, geochemistry and geophysics and importantly includes known economic deposits as training data to weight and model themes. The main geological features from the Avebury mineral system model were used to develop predictive themes from the wealth of digital data available.

The weights of evidence modelling technique combines weighted themes to create a prospectivity map showing areas with a high probability of hosting granite-related nickel deposits. Fourteen mineral deposit locations for hard rock nickel mineralisation with an association with younger felsic intrusive rocks were extracted from the mineral occurrence database as a training dataset. These occurrences come mainly from the Avebury area in Tasmania. The Mt Cobalt nickel prospect in the Gympie area of Queensland, where drilling was pending for Avebury style nickel sulphide, was excluded from this training data so the area could be used as an independent test of the modelling results.

The model produced highlighted the importance of geology and geochemical datasets as predictors of mineralisation. Regions identified by the model as having potential to host nickel mineralisation similar to the Avebury Deposit have been located throughout eastern Queensland, New South Wales, Victoria, Tasmania, and the Tasman District of New Zealand. Importantly, the Mt Cobalt site near Gympie in Queensland (which was excluded from the training data set) and the Avebury deposit in Tasmania have been found as highly prospective supporting the validity of the model as a predictor for nickel sulphide mineralisation.

Accord is in the process of preparing an initial public offering, in which the tenements acquired as a result of the modelling completed by Kenex will form part of an attractive portfolio of projects.

Kenex

MINERAL PROSPECTIVITY MODELLING

Kenex

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