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CONTENTS

SILICON DALE

The true nugget effect?

By Steve Henley

One of the most important assumptions behind geostatistics is that the semivariogram uniquely describes the spatial covariance properties of a data set (a correlogram can be used instead, of course, but the mathematical relationship between the two is close enough). Implicit in its computation is that the only factor controlling the semivariogram value is the lag distance between any two points in the region under investigation. Geostatistical practitioners normally assume that any inhomogeneity can be removed by defining homogeneous zones, and for the purposes of this discussion we shall accept that this can be done (though it's a big assumption and often not true). The very real problems of non-stationarity have been discussed in another Silicondale column and therefore shall also be ignored for the purposes of this discussion.

Nevertheless, in deposits of many minerals (especially gold, PGMs, and diamonds) it is found that there will be many lower-grade assays and relatively few high-grade assays. This can also cause problems in applying geostatistical methods, due to apparent highly skewed data distributions. For this reason, a number of methods have been developed including lognormal kriging, indicator kriging, and multigaussian kriging, in attempts to make the skewness more tractable.

However, the real problem is perhaps a little more serious than these methods allow. Geostatisticians have long recognised that there is often a 'proportional effect' in which higher grades are associated with higher variances and hence with a higher sill on the variogram. It has been claimed that the use of relative variograms can help to overcome this proportional effect, in which higher grades are associated with higher variance. Relative variograms, with variance adjusted for grade, may allow the sill variances for high and low grades to be harmonised. But there is another effect which cannot be handled (or allowed for) by geostatistical methods and which (perhaps as a direct result) has remained unmentioned. This is that not only the variance but also the range can be dependent on grade. It is evident that a low-grade sample is likely to be representative of a much larger surrounding volume than a high-grade sample (or in the extreme case a nugget, where the range is reduced to the radius of the nugget itself). There is no way that computation of relative variograms can overcome an inverse relationship

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between grade and range.

That this can be a very real practical issue is illustrated by a known problem with multiple indicator kriging. Here, a series of cutoff grades is defined, and a set of 0/1 indicators defined for each cutoff. It is then possible to compute variograms and fit variogram models for each cutoff. There is nothing constraining these variogram models to have the same parameters for each and every cutoff (indeed the models used may themselves vary - for example, exponential for one cutoff, spherical for another, and with different amounts and directions of anisotropy. In particular it should be noted that the range may vary. Unfortunately, in the formulation of the multiple indicator kriging method, such differences in variograms for each cutoff can lead to logical inconsistencies ('order-relation problems'). Indeed, this is but one of a number of reasons why indicator kriging itself is in my opinion seriously flawed (but that's another story - see ESCA vol.17, no.1, Sept 2001).

I would propose that any solution to this problem caused by the true nugget effect must allow the actual grade of samples to influence the estimation method. In geostatistics the only control is provided by the spatial distribution of data points and a variogram model (or set of variogram models) which are completely unaffected by local grade variations. In conventional (i.e. non-spatial) statistics, analogous problems have been addressed in recent years by the development of adaptive estimators. Such estimators can adapt to the local properties of a data set, to give much more reliable estimates than are offered by the rigid traditional methods. How such adaptive estimation techniques might best be translated into spatial estimation is not yet clear, though their relationship with nonparametric statistics suggests that a nonparametric approach would be more appropriate than the "classical" least-squares based geostatistical methods.

One or two of these methods were explored in my book Nonparametric Geostatistics. This is now out of print, but I have 30 remaining copies available. A copy of Fortran source code which includes examples of such estimation methods is available for free download as part of the nonparametric estimation package on www.silicondale.com.

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Web: *www.SiliconDale.com www.G-EXEC.com*
Mining/geoscience domain names are available for purchase, including "geosciences.com" and more. See *www.domain-mine.com* for details.

Introducing NetVision: Surpac Links All Project Members Together through a Web Browser

By Heather Ferguson, Surpac Software Intl.

International mining software developer, Surpac Software, is on the verge of delivering an integration solution which will have a huge impact on the way that technical teams and management of mining organizations function. The company is on track to launch the industry's first Web Browser based 3D working environment, NetVision. This is an important breakthrough that allows technical professionals and managers to re-establish the concept of an effective team based culture between the various disciplines and managers involved in mineral resource and project development.

SURPAC Vision's 3D modelling and design tools will be shared on-line through NetVision.

Top mining executives at BHP Billiton, Rio Tinto, Noranda, Placer Dome, Sons of Gwalia, Codelco and many more companies worldwide have recently participated with Surpac Software Intl. in exploring which mine technical issues are currently seen as greatest in significance to the industry. It was little surprise to find that many mine managers still feel that due to a variety of technical bottlenecks and practical issues like geographical location, their most essential contributors to a project, the geologists and engineers, still largely work independently with little teamwork. Even the project managers still feel somewhat removed from the processes and detailed

knowledge of the technical decisions and risks surrounding their projects. Surpac Software is preparing to overcome this problem.

The welcome news is that NetVision, using client-server technology allows Surpac Vision to operate through a Web Browser. NetVision is team oriented so that other team members and managers can join the same session, collaborating on a project. It opens the door for the re-establishment of genuine technical teams where experts can collaborate across a Network, or even the Internet, without being in the same location. It is aimed directly at the issues of project risk and project value, through better sharing of expertise and experience, brought together though web-based collaboration. A manager or consultant can join the session to gain information or provide input by simply starting their Web Browser and requesting entry to the session. Mining executives agreed that this would have tremendous corporate implications.

Over the past 3 years Surpac has made a large investment in research and development to prepare for this time. Using NetVision, any Web Browser can be a fully interactive functional interface to Surpac software, not just an image. The graphics are fully 3D with real-time image rotation that uses the local graphics card to drive the graphics. The image is shared using breakthrough, streaming graphics technology and after a few moments, when the geometry data is deployed, the speed of rotation and viewing is as smooth as working on local machine. Some clients are using an early release of NetVision now, and mid-2002 is slated for worldwide release.

The performance of NetVision over the Internet is stunning, according to Ralph Smith of Australian Mine Design & Development, even with a 56k modem, "We have an early version of NetVision, and have spent some time testing it. It was very easy to install, and already we have plans to work more closely with staff in our Brisbane office. This is one of the most significant developments the industry has seen in years."

For more information visit the Surpac Web page at *www.surpac.com*. Surpac Software International Pty Ltd. Level 8, 190 St Georges Terrace, PO Box 7495, Cloisters Square, Perth Western Australia 6850. Phone: +61 8 9420 1333. In North America: Surpac Software International (Canada) Ltd. 1122 Mainland Street, Suite 330, Vancouver B.C. CANADA V6B 5L1. Phone: +1 604 602 1200. Fax: +1 604 602 1201 E-mail: *ssican@surpac.com*

Enhance Profit! Slash Belt Conveyor Price And Costs

By Don Suverkrop, Creative Engineering

Trade in belt conveyors is plagued with the same human foibles that surround traffic in other goods. Whether the bargaining table is the hood of an old pick-up truck or a polished conference table in a high-rise board room, price dominates bartering. Unfortunately, this emphasis can have dire consequences.

Factory completed machinery like tractors and trucks enjoy a level of quality control. The bulky nature of belt conveyors, site specific needs and the different trades, sub-contracts and professions involved in putting it all together works to leave responsibilities split, quality control in limbo and much finger pointing.

Death, injury, business interruption, high maintenance and litigation result from poor quality. Compromises to meet competition or simply poor design contributed to this weakness. This is particularly paradoxical when higher quality can so often be provided at lower cost.

Supporting quality at least cost Creative Engineering developed computerized cost based optimization, a real-time concurrent optimization of both design and price aspects. By eliminating the time delay between design and estimating procedures the interrelation between the two is instantly seen from which proactive optimization is undertaken.

Since the optimization is driven by relative (rather than absolute) prices the default price multipliers, obtain the same advantage regardless of currency or discount. However, a number of program users develop their own sale prices simply by editing the price multipliers to suit their own requirements. Supporting letters are at *www.beltconveyor.com*.

Reduce Purchase Prices

Determining belt conveyor price or cost is essential to many business, planning or marketing purposes. Finding least cost while meeting quality objectives is the ideal objective.

At constant quality any belt conveyor can be built in virtually millions of different design and component combinations. For example, the Belt Conveyor program's dynamic tension analysis during running, acceleration, deceleration and stopped belt conditions finds the maximum idler space and cost

savings for each section without incurring idler overload or spillage from tension related causes.

The program's integral cost data base combined with user multipliers and price display enables rapid selection of the least cost combination. Price multipliers may be fine tuned to establish sale prices or adjustment may be made in the quality/cost relation itself to better address a particular project need.

The mundane work of cleaning up spillage frequently incurs the biggest cost of belt conveyors. It is less costly to fix problems during the design stage than live with heavy maintenance costs for the life of the conveyor.

For example, often forgotten is the importance of maintaining proper tension to preserve the familiar cup-shape profile needed to contain and transport material. Even though tension may be suitable for normal running conditions loss of drive force during deceleration sometimes reduces tension sufficiently to invite belt sag and spillage or worse festooning (a total collapse). The relatively short duration of these occurrences makes the source of the problem difficult to identify but keeps workers busy with hand shovels nevertheless. These effects are not widely understood and most computation methods don't take the phenomena into account.

The same dynamic tension analysis that works to reduce idler costs effectively reduces the cost of spillage at the same time. A rigorous scan is made of each section looking for defects. Minimum tension occurrences are interpreted in terms of idler space and extra tension recommendations. Peak tension occurrences are interpreted in terms of belt, shaft, pulley and drive design requirements.

Results are summarized at the *Optimization Action Plan* in the software. Also in the program, *Cautions and Suggestions*, triggered by defects and anomalies, explain in plain English recommended action to be taken by the Program user to improve quality or reduce cost.

User modeling of power, starting torque acceleration time and deceleration time regulates acceleration and deceleration rates as well as related forces. Simply by modeling motor control parameters much can be done to reduce spillage.

Replacing under-strength components within a predictive maintenance program reduces the cost of fatigue and other untimely failures.

Reduce Haul Costs

Successful belt conveyors maximize Return on Investment, Net Present Value, or Internal Rate of Return of the investment in entire systems. HAULPLAN and INV financial programs provide rapid feasibility and haulage analysis for complex quarry, mine and industrial systems. Automatic generation of these indices enables selecting an economically preferred system by non-financial types.

Reduce Structure Costs

The cost of fabricated steel supporting belt conveyor components and load is sometimes the largest cost of a conveyor. Efficient design of belt conveyor structure is essential to safety, project feasibility and successful marketing. However, structural design is seldom the skill strength of those estimating belt conveyors and coordinating this requirement with other professions frequently delays timely project execution or bidding.

To develop a preliminary structural design and sufficient information for estimating purposes the Program includes sub-programs for the design of trusses, support bents and radial stackers. Typical box trusses may be designed using angle, channel, wide flange, square and round tubular members in Howe, Pratt and Warren styles. The total weight is displayed from which cost or sale price may be determined using fabricator's unit cost as a basis.

Only limited structural knowledge is required. The adequacy of each structural member is based on the display of Uniform Building Code approved "Interaction Result". This is a single number that represents all forces acting on a member. A properly designed member should always have an interaction result less than one. The program user intuitively adjusts member sizes until this result is achieved.

Latest program version incorporates methods of Load and Resistance Factor Design Specification for Single Angle Members, Manual of Steel Construction, Third Edition.

Summary

From an all-inclusive descriptive file covering parameters, sections, drive, shafts, shaft factors and price multipliers, the *Optimization Action Plan* automatically scans thousands of output data relationships during running, acceleration, deceleration and stopped conditions searching for defects, bugs and anomalies. Triggered *Cautions and Suggestions* spell out in plain English action necessary to remove defects, improve design or lower cost. Augmenting each user's talent is brought a wider skill and technical knowledge. Quality at least cost is the result.

Program User Experience

The success of this approach is perhaps best measured by that of hundreds of worldwide users in building thousands of belt conveyors. See user letters at our web site.

Prove It To Yourself

A free video tape and program disk provides opportunity to work specific examples up to 40,000 feet or 12,100 meters taken from CEMA Manual as well as free use on any conveyor up to 200 feet or 64 meters in length. A free trial of the full program is also available. For further information, visit www.beltconveyor.com. Creative Engineering, 3513 Century Drive, Bakersfield CA 63306. Tel: 661-872-4763. Fax: 661-871-1798.

You *can* have your cake and eat it too!

Whittle Programming Bought by Gemcom Software International Inc.

By David Whittle

In 2001, the directors of Whittle Programming Pty Ltd determined that the company could best serve its clients by joining forces with another software vendor in the mining industry and it was determined that Gemcom Software International Inc. was the most suitable partner. We have worked hard over many months to bring the companies together and plan for the future, and on 15th January 2002, the sale of Whittle Programming to Gemcom was completed.

Overall, Whittle customers support this initiative. The coming together of Gemcom and Whittle will benefit Whittle's clients. Whittle clients throughout the world can expect to see improvements in the support services in the coming months:

- Whittle's key technical staff will be relocated to Vancouver. With these staff, goes Whittle's principal support service, and because of Vancouver's more favorable time zone, many Whittle clients will find they have improved access to the very best people.
- A support service is currently being established in Perth, and this will be operational prior to the closure of the Melbourne office. Since most of Whittle's Australian clients are in the west, Perth is the ideal location for the Australian support service.
- Work has commenced on establishing a Whittle Centre of Excellence in Johannesburg, hosted by Gemcom Africa. This will be Whittle's first support, training and consulting offering on the African continent and considerable thought and effort is being put into the project to ensure that the Centre of Excellence lives up to its name.
- Most support centers will be linked together using Gemcom's ONYX system, providing the Whittle support network with an unprecedented upgrade to their ability to share knowledge and resources.
- Whittle will utilize Gemcom's established web-based system for speedy dissemination of bug fixes and updates to clients.

Clients will be notified when each of the above changes takes effect, and there will be no discontinuity of support services during the transition.

The synergies between Gemcom and Whittle will lead to many improvements to the products and services in the future. Though many changes are envisaged, the essential character of Whittle software will be preserved, whether you use Whittle software alongside Gemcom, Vulcan, Surpac, Micromine, or any other generalized mining software package.

The existing agency network includes offices of Maptek, Surpac and Micromine and a selection of independent consultants. These agencies will be preserved, so that users continue to deal with known Whittle representatives. Of course, Gemcom offices around the world have been agents for Whittle for over a decade, so many clients know and trust Gemcom as our representative. The sale of Whittle to Gemcom will lead to improvements in Gemcom's ability to present and support Whittle to the international mining community.

The benefits to Whittle clients of the coming together of Gemcom and Whittle Programming will be significant and ongoing.

For more information contact Gemcom Software International, Inc. Suite 400, 1285 West Pender St., Vancouver BC V6E 4B1 CANADA. Tel: 604-684-6550. Fax: 604-684-3541. E-mail: *sales@gemcomsoftware.com*. Web: *www.gemcomwoftware.com*

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E-Commerce Update

CopperConcentrate.com

CopperConcentrate.com facilitates periodic interactive auctions of copper concentrate over the Internet. All bidding participants must be pre-qualified. The pre-qualification process includes a sales agreement and related documents which specify all of the primary commercial terms relating to the auctioned quantity of copper.

Asset Trade

AssetTrade is an industrial asset recovery and disposition company. AssetTrade provides comprehensive Disposition Chain Management™ services for Global 2000 companies to maximize the value of surplus assets and to ensure that all buyers can purchase used equipment with confidence. The strategic partner network includes leading auctioneers Henry Butcher International and Michael Fox International, and surplus equipment dealers Perry-Videx and Graphworld. To learn more about how AssetTrade can help you buy and sell used equipment, visit *www.assettrade.com* or call 1-888-686-2954 in the U.S. or 001-610- 992-1900 outside the U.S.

MiningBid

http://www.miningbid.com.au/

This site provides auctions that connect buyers and sellers. MiningBid began operations in 1999 conducting Business-to-Business (B2B) reverse auctions on the Internet for some of Australia's largest miners and industrialists. The business grew rapidly and clients now include miners in the coal and metalliferous sectors, including base and precious metals as well as iron ore. MiningBid clients are represented Australia-wide as well as in New Zealand, Papua New Guinea, Africa, Europe and North America.

MiningBid enlists and qualifies suppliers and negotiates contracts for supply and fulfillment using a variety of dynamic bidding situations. A badged reverse auction is a platform where large organizations run online reverse auctions under their own name using MiningBid support resources.

Services provided by experienced staff includes advice on:

technical support in specification development
market research
supply chain management
process re-engineering
procurement services
transaction based financing

A new free service provides an arena where miners and related companies can list surplus and obsolescent equipment and spares on a dedicated website. A large range of discounted spares for Atlas Copco and Caterpillar machinery are presently available.

For more information contact MiningBid.com, 77 Lithgow Street St Leonards NSW, Australia 2065. Phone: +61 1300 657 139. Fax: +61 2 9906 5540. Email: *info@MININGBID.com.au*

Mackwood Mine Services

http://www.mackwoodmineservices.com/

This site lists equipment for sale. It does not offer on-line auctions.

Didger 3

Didger is a highly accurate digitizing program that precisely transforms points, lines, or areas from paper maps, graphs, aerial photos, scanned raster images, imported vector files, or GeoTIFF images to a versatile digital format you can use with your other software.

There are three ways you can digitize information from your source documents or files. You can digitize hard copy documents using any Wintab32 compatible digitizing tablet. You can digitize digital information, such as vector or raster files, onscreen. You can also use your GPS unit to digitize your position or trace your route directly onto a map imported into a vector project.

Onscreen digitizing is done using an imported bitmap or a scanned image. Scanning is provided directly in the software and the image can be calibrated in real world coordinates using one of ten georeferencing methods.

Raster Based Maps

Once the image has been calibrated, you can digitize points, polylines, and polygons. The digitized objects can be exported with the image in GeoTIFF format or the digitized objects can be exported without the underlying bitmap and still retain the georeferencing information. Numerous bitmap filtering options are used to identify and digitize the objects.

A georeferenced raster image retains all georeferencing parameters. When you import a georeferenced raster image, you can skip the calibration process and start digitizing immediately. You can import a georeferenced raster image into a vector or a raster project.

If you import a georeferenced bitmap into a vector project, you can overlay it with other data or vector files or tile it with other georeferenced bitmaps.

Vector Based Maps and Data Files

A variety of vector based maps and data files can be imported in many formats. When large coverages are created by importing several vector or data files into one project, the files will align according to their coordinate systems. Different files can be imported onto separate layers.

If the files are projected and contain different projection information, they will be converted to the projection of the first imported file using a datum transformation. You can also convert vector or data files from one projection to another.

Coordinate Conversion

Converting data from one coordinate system to another is an advanced feature. Didger supports over 20 projections and over 200 datums. Files are calibrated or imported using one of the projections and coordinates are converted so all layers are on the same projection. Supported projections include:

- Albers Equal Area Conic
- Azimuthal Equidistant
- Eckert IV
- Eckert VI
- Equidistant Conic
- Gauss-Kruger/Gauss Conformal
- Lambert Azimuthal Equal Area
- Lambert Conformal Conic
- Mercator
- Miller Cylindrical
- Mollweide
- Orthographic
- Equidistant Cylindrical
- Polyconic
- Robinson
- Robinson-Sterling
- Sinusoidal
- State Plane 1927
- State Plane 1983
- Stereographic
- Transverse Mercator
- Unprojected Lat/Long
- UTM

In addition to projection and datum transformations, Didger can also convert coordinates of vector projects by utilizing either a math or georeference operation. Converting coordinates by applying a simple math operation allows the user to specify a value to add, subtract, multiply, or divide to the current vector project.

Advanced georeferencing conversion is also available. By specifying the source and destination coordinates of the vector project, Didger's georeferencing methods allows the user to convert the current project to the new destination coordinate system.

Following are some of the major new features in Didger 3.

- Import georeferenced bitmaps into vector projects and overlay it with vector and data files, or tile it with other georeferenced bitmaps.
- GPS Digitizing directly. The software enables the GPS to plot data directly on a map or save the GPS data to a text file. View your current elevation, see the current position of the satellites that are being used for a lock, display the raw data being sent from the GPS, and set the GPS input datum in the GPS Commander dialog box.
- Image Warping. Warp or rectify a bitmap in a raster project. Calibrate the image in a raster project, then use the Warp Image command to rectify the image to match the calibration points.
- Add a Graticule or Grid so the locations of your maps are easy to determine.
- Enhanced Layer Manager
- Coordinate Manager. Display all the coordinates of a selected object in a raster project in the Coordinate Manager. If you are in a vector project, you can also edit the coordinates within the Coordinate Manager.
- Convert the projection of bitmaps. Import a bitmap into a raster project, calibrate it, and then convert the projection into any of the 23 supported projections.
- New Bitmap Clipping Options. Bitmap clipping greatly enhances the ease-of-use when working with bitmaps. You can also define any polygon on a bitmap and then use that polygon to clip the bitmap.

Nearly all digitizing tablets work with Didger. If you already have a tablet, Didger requires a 32-bit WinTab compliant digitizing tablet driver, available from most tablet manufactures (for no charge) or from third party vendors.

Price of the software is $329. Golden Software, Inc. 809 14th Street, Golden, Colorado 80401-1866 Phone: 800-972-1021 (continental U. S. only) or 303-279-1021. Fax: 303-279-0909. E-mail: *info@goldensoftware.com*
Web: *www.goldensoftware.com*

Free Demos

Surpac

SURPAC Vision: comprehensive package for exploration, mine design and production.
Quarry: Industrial Mineral project reserves, pit design, volumetrics.
XPLORpac: geological exploration, sections, maps, 3D modeling.
DrillKing: core logging and database management. 100% enabled for 30 day free trial.

A free CD is available on request, including option to install any software package for trial 3D viewing, DB mapping, sectioning, import/export functions. On-line instructions are provided for self-demo. All CD's present introductory video overviews that require no installation. Submit your request on-line at *http://www.surpac.com/products/index-products.html* or e-mail *ssican@surpac.com*.

Carlson Software

http://www.carlsonsoftware.com/info_request.htm

A free trial CD is available from Carlson Software. These surveying and mine planning programs run with AutoCAD. Some downloads are available on-line, but the full trial program is available only on CD.

The Mining Toolbox

These programs are Excel spreadsheet applications. Some will work only in Excel 97 or Excel 2000 and some programs will work with either. Applications include:

Geology & the Environment: Elementary Statistics, Sample & Population Testing, 2D Regression Analysis, Distance Weighted Cross Validation, Isotropic Variogram Modeling, Directional Variogram Modelling, Grade – Tonnage Estimation, 2D Contouring, Block Modeling.
Mining Engineering: Method Selection, Surface Drill & Blast Design
Mineral Processing: Method Selection, Assay Sample Size Design
Economic Evaluation: Surface Project, UG Project, Surface Cashflow Template, Underground Cashflow Template.

More information is available on the Web site. The free trials can be downloaded from *www.theminingtoolbox.com*

GIS

ESRI Free Page:
http://www.esri.com/company/free.html - This page highlights all the free resources from ESRI, including a free copy of ArcView 1.0, demos of other software, publications and pointers to free training available on the ESRI Virtual Campus..
MapMaker: *http://www.ibmpcug.co.uk/~MapMaker* - This site has a free basic GIS program for Windows. The program is more user friendly than ESRI and is a good tool for learning GIS.
GeoFinder 3.1:
http://www.thomas.com/prod/geofind.html --Thomas Bros.' Mapping Software and data. Demo.

Surveying and Mapping

SeisSoft Molodensky Transform v1.0
http://www.connect.net/jbanta/Downloads.html - Several shareware programs for coordinate transformation are available on this site.
Cogoarc: *ftp://ftp.sonic.net/pub/users/trollhei/cogo* - This is a DOS cogo program from the Mississippi Highway Department. The program is in a zip file.
AutoCAD utilities:
ftp://ftp.sonic.net/pub/users/trollhei/autolisp - Miscellaneous layer utilities and typing shortcuts. Written for production CAD work.
Boston Harbor Software: *http://www.bhsinc.com/* - A selection of free AutoCAD software for civil engineers and surveyors is available.
CAD Depot - *http://www.caddepot.com/* - This site has free online CAD shareware archive with utilities for AutoCAD, Microstation, SolidWorks, IntelliCAD or other CAD programs.

Scientific Software Group

http://www.scisoftware.com/html/demos.html

SSG distributes groundwater, surface water, bioremediation, geology, air pollution, and other environmental software. Demos are available on all of the software (over 50 programs) they offer.

Aggregate Plant Flow Analysis Software

http://www.bedrocksoftware.com

AggFlow 5.0 is a plant flow analysis software program developed for the aggregate and mining industry. Use AggFlow to build a crushing plant on the computer screen, choose equipment types and settings, monitor flow rates and gradations at desired points, then run the plant. By experimenting with different types of equipment and their settings, you can fully optimize crushing, screening and washing equipment to maximize the production of desired products. Aggregate producers, equipment manufacturers and dealers around the world use AggFlow to reduce calculation time and increase productivity of their aggregate and mining operations. A free demo and AggFlow Reader is available from the Web site.

Cole/Parmer Collect®

http://www.coleparmer.com/catalog/

This software collects and stores data from multiple instruments into one Excel® spreadsheet. Collect transfers your data directly into software programs for manipulation. Collect XL has been designed specifically for use with Excel; Collect CE has been designed to interface with standard PDAs. All software contains setup information and default parsers for over 400 laboratory instruments. Demo is 3.43 Mb.

The INTERNET

LandViewer

www.LandNetUSA.com

LandViewer is an Internet based application that allows users to search for a map of any land in the continental United States. The land can be viewed using a variety of maps and satellite images at different zoom levels. Using LandViewers interactive drawing tools the user can delineate property boundaries and also make distance and area measurements. Once a boundary has been drawn the user can print out a variety of customizable maps including a free USGS topographic map. The first map you generate on-line is free. The site also points to over 2000 links related to land such as land development, land exchange, legal descriptions and more. To get the best response, it helps to have a fast Internet connection, because maps are printed to the screen.

Geological Surveys

www.mgsz.hu - Hungary
www.cprm.gov.br - Brazil
www.mta.gov.tr - Turkey
www.pgi.waw.pl/en - Poland

Land Surveying

http://www.sonic.net/~trollhei/index.html

This site has an extensive list of links to sites for surveying, mapping, data, usenet discussion groups and more.

International Mining Professionals Society

http://www.intlminingsociety.org/

Over 40 categories of mining articles are on the site. The articles are submitted by members of the mining profession and are not necessarily published elsewhere. Under Industry News and Trends, articles about over 40 countries can be found. The site is rather new, so not all countries have reports installed at this time.

General country data and mineral production is provided for 10 countries: Australia, Brazil, Canada, Chile, Indonesia, Mexico, Peru, Russia, South Africa, and the USA.

A discussion board is provided where you can post and view messages. Some services are also listed.

IMPS is a non-profit educational association established to provide a forum for professionals working on international mineral development projects to share their knowledge and experience. IMPS welcomes all the disciplines involved in international mineral development – accountants, engineers, consultants, lawyers, economists, business managers, and other professionals.

Discussion Forum on Micromine Web page

Micromine has introduced chat forums on the web site for the convenience of users. The intention of the forums are to boost user to user interaction as well as provide a feedback area to Micromine staff, provide useful tips and hints, constructive criticism and to suggest features. Important news and announcements will also be periodically posted to the forums.

To access the forums, follow the link from the home page at *www.micromine.com.au*. You must register to post to the forums, (click on the register link on the forum page). All registered users details are kept strictly confidential. Some of the forums are product specific and several are general.

Whittle

Strategic Mine Planning discussion group
http://groups.yahoo.com/group/whittle-users/join

Environmental Software

http://www.environmental-center.com/software/
Lots of good categories include: air pollution, health and safety, management, monitoring and analyses, soil and groundwater, water and wastewater, waste and recycling.

BOOKS

Mine Planning and Equipment Selection (2001)

Edited by Raj K. Singhal and Bhaskar Pratap Singh, Oxford & IBH Publishing Co. Pvt. Ltd. Order from : Science Publishers, Inc., P.O.Box 699, Enfield, NH 03748, USA. E-mail: sales@scipub.net

This book comprises the proceedings of the tenth international symposium on mine planning and equipment selection (MPES2001) held in New Delhi India in November 2001. This symposium has come to be recognized internationally as an event promoting international technology transfer in various facets of mining technology. A wide range of high quality, state of the art papers from North and South America, Europe, Australia, Africa and Asia were presented. Major topics covered were: Mine Equipment Selection (26 papers); Mining Methods for Open-Pit and Underground Mining (36 papers); Coal and Mineral Processing(6 papers); Design and Planning of Surface and Underground Mines(22papers); Geo-technical Stability in Surface and Underground Mines(21 papers); Health, Safety and Environment (20 papers); Mine Maintenance and Production Management(11papers); and Late received Papers on various topics((papers)

This volume of nearly 1100 pages contains a wealth of up-to date information. Note: A few copies of this book are available for a limited time from Ms. Margaret-Anne Stroh, University of Calgary Tel: 403-220-6229: E-mail: *mastroh@ucalgary.ca* at a cost of $120 excluding postage.

El Nino Analysis

Researchers at the National Center for Atmospheric Research and the University Corporation for Atmospheric Research examine forecasting from multiple angles in two new books. One spells out the lessons learned by policy makers and emergency planners from the 1997-98 El Nino and how to make best use of El Nino forecasts next time. The other shows how improved weather and climate forecasting will emerge from a new program over the next decade to monitor key atmospheric conditions via satellite.

The new books are:

Once Burned, Twice Shy? Lessons Learned from the 1997-98 El Nino, edited by Michael H. Glantz. United Nations University. Press, 2001, 294 pp., ISBN 92-808-1063-4, paper.

A limited number of copies, plus CD-ROMs with the full text of country reports, are available free of charge. In the Western Hemisphere, contact NCAR Environmental and Societal Impacts Group: P.O. Box 3000, Boulder, CO 80307, USA. Telephone: +1-303-497-8134; fax: +1-303-497-8125; e-mail: *enso@ucar.edu*; Web: *http://www.esig.ucar.edu/once.html*. For the rest of the world, contact UNU Press at 53-70, Jingumae 5-chome, Shibuya-ku, Tokyo 150-8925, Japan. Telephone: +81-3-3499-2811; fax: +81-3-3406-7345; e- mail: sales@hq.unu.edu; Web: *http://www.unu.edu/unupress/hq_howto.htm*.
On the Web: The Case of the 1997-98 El Nino: *http://www.esig.ucar.edu/un*

Applications of the Constellation Observing System for Meteorology, Ionosphere and Climate (COSMIC), edited by Lou-Chuang Lee, Robert Kursinski, and Christian Rocken. Springer-Verlag, 2001, 380 pp., ISBN 962-430-135-2, hardcover. Ordering the book: Springer-Verlag New York, Inc., 175 Fifth Avenue, New York, NY 10010, USA. Telephone: +1-212-460-1500; +1-800-777-4643; fax: +1-201-348-4505; e-mail: service@springer-ny.com; Web: *http://www.springer-ny.com/detail.tpl?isbn=9624301352.*
On the Web: COSMIC project home page: *http://www.cosmic.ucar.edu*

Risk Analysis II

Editor: C.A. BREBBIA, Wessex Institute of Technology, UK
With the development of computational methods and the ability to model systems more precisely, scientists and engineers can now quantify hazards, simulate their effects and analyze the risk potential with greater accuracy, providing for more effective risk management. The papers presented at the Second International Conference on Computer Simulation in Risk Analysis and Hazard Mitigation, which comprise the content of this book report on new work in this area by experts from around the world.

They cover all aspects of risk analysis and hazard mitigation associated with both natural and

anthropogenic hazards, including issues related to sustainable development and the safe and efficient use of resources.

Series: Management Information Systems, Vol 3
ISBN: 1-85312-830-9 2000 584pp
£193.00/US$299.00. For more information contact Computational Mechanics Inc. 25 Bridge Street, Billerica, MA 01821, USA Telephone: 978 667 5841 Fax: 978 667 7582 Email: *info@compmech.com* *http://www.compmech.com/witpress/r100.html*

CALLS FOR PAPERS

International Association for Mathematical Geology (IAMG), Berlin Germany

Details of the conference can be found on the web site: *http://www.fu-berlin.de/iamg2002*.

Submitted contributions will be accepted for oral, poster or software presentation after review by at least two referees. The Organizing Committee considers the posters and software presentations as important as oral presentations, and the publication of each type of contribution in the proceedings volume is anticipated. Interested contributors should submit one-page abstract of 200 to 400 words in English without figures or references before January 31, 2002. Notification of acceptance together with the instructions for camera-ready manuscript (maximum 6 pages) will be mailed on March 31, 2002. The final camera-ready copy will be due before June 15, 2002. Participants will receive a volume of the extended abstracts at the conference.

Abstracts can be submitted on line. For other information or to send an abstract, contact the Local Organizing Committee, IAMG'2002 - conference secretariat, Freie Universität Berlin, Malteserstr. 74-100, D 12249 Berlin, Germany. Phone 0049 30 838 70570 fax 0049 30 838 70723.

NEW DEVELOPMENTS

Prorok

Propack is a package containing several Microstation 3D CAD applications, and one Windows-application.
ProPack is a package of software modules specially designed for three dimensional modeling, including calculation of ore reserves, planning of underground mining, engineering, and geology. The application communicates directly with dBase database tables. Project management and database editing utilities are included in the package.

All modules are developed in MicroStation Development Language (MDL), which makes it easy for MicroStation users to learn the new applications with a minimum of training effort. This allows the user to obtain maximum productivity in a short time.

All graphic data in the design file are linked to a database. This enables analysis of different data sets and selection of objects by specifying SQL search criteria. Detailed information about an object can be requested interactively. It is also possible to modify information from within the program.

ProPack includes the following modules:

- *GeoCad*, a powerful tool for graphical presentation and management of drill hole data in MicroStation 3D design files.
- *Triangles*, a program created for interactive modeling, analysis and presentation of rock masses in three dimensions.
- *OreVal* calculates ore reserves from triangulated (wireframe) models created by Triangles.
- *KNets* creates coordinate nets in Microstation design files.
- *dbBrowse* is an application for viewing and editing dBase tables from within Microstation.
- *C-Map* is designed to make core-mapping an easy task. It will assist you with direct visualization of your input, storage of data in databases and output on paper.
- *BlockVal / BlockCad* is an user adapted application for presentation and evaluation of blockmodel data.

For more information contact Prorok AB, Box 313, S-931 23 SKELLEFTEÅ, SWEDEN
Telephone +46 910 125 09. Fax +46 910 890 47. E-mail: *info@prorok.se*. Web: *www.prorok.se*.

MineSight 3-D - Mintec

The major new release of this software is called *MineSight 3D* and is a greatly-improved version over the earlier version 2. The graphical interface still has the same look and feel with the data manager and viewer windows. New functions, tools, features, and important new engines are included in the newest version. Interactive Planner (IP) is incorporated as well as the ability to store attributed geometry in a relational database.

Other new features include a surface-surface intersector and totally revamped solid-solid

intersector. A new Drape tool has been added to the Tools menu and will drape polylines, markers, and labels to a surface. Collar and downhole survey information can be edited and drill hole intervals can be changed directly in the software.

For more information contact Mintec, 3544 E. Fort Lowell Road, Tucson, AZ 85716-1705. 520-795-3891. Fax: 520-325-2568. E-mail: *market@mintec.com*. Web: *http://www.mintec.com*.

PC Survey

PC Survey is a Microsoft Windows application that has been specifically designed to fulfill the calculation and drawing needs of the professional land surveyor. The software includes COGO/CAD drafting, Sheet design and layout, DTM/contouring, and fieldbook survey.

CE Survey is a simpler version of PC Survey available for handheld devices running Windows CE.

GMS 2100 is a program for single frequency GPS point collection.

For more information, call 800-652-7279 or send an email to info@pcsurvey.com. Soft-Art, Inc./GMS, 103 Sumner Court, Hendersonville TN 37075. 615-826-7952.

Plan 2002 and Plan Plus 2002

Plan is a Windows-based program that allows users to planimeter contour maps. Within the program, maps are entered from a digitizing tablet and contour areas and map volumes are computed. Plan can analyze isopach, pore volume, hydrocarbon pore volume, and structure maps. Scales can be English or metric units. Faults, sink holes, and well locations can all be included on the map.

Once a map is digitized and saved it can later be reloaded and contours edited. A redigitizing feature is available for quality control. Volume methods include trapezoid, pyramid, combination, quadratic, step, ratio, Simpson's and 3/8 rule. Price: $750.

Plan Plus includes the basic features and adds viewing contour maps in three-dimensions, computing drainage radii, analyzing volumes from structure maps, discretizing values from contours, analyzing complex maps of multiple hills and valleys, and printing or plotting maps in various scales. Files can be saved in several graphics formats including AutoCAD DXF. Price: $2000.

For more information contact The Logic Group, 1024 Patterson Ln., Austin, TX 78733. 512-263-0118. Fax: 512-263-0131. E-mail: *jwalsh@logicgroup.com*. Web: *www.logicgroup.com*

MineVision

MineVision from Wenco International Mining Systems dynamically displays current position and status of all equipment in a mine. Wenco supplies mine management systems for real time fleet monitoring and other operations control and monitoring systems. Each item in MineVision contains a complete list of properties available with a click of the mouse. In addition to a truck's number and current status, the user can also see shovel assignment, dump assignment, dump count, payload for current and previous load, material type, ore quality, total payload for shift, operator name and employee number... A similar list of properties are available for loading units, auxiliary equipment, locations, routes, drills and drill holes. All displayed over the mine map.

The mine map is imported from mine planning CAD files or Shape files. Locations , routes, blocks, etc., are generated from WencoDB and layered over the map. The user controls which ones are displayed and their associated colors.

With current equipment details, access to WencoDB, and the ability to review past activities, MineVision is a blend of real time inputs, system integration, data manipulation and analysis. GIS object editing and historical data analysis is part of the system.

Database editing can be done graphically for any GIS-related object. Descriptions, parameters, and GIS positional data can all be edited. Some of the editing abilities include: create new locations, edit existing routes, or delete GPS addresses. A wizard walks the user through the editing process to ensure data integrity and promote ease of use.

Historical data analysis provides for display of all dumps made for a particular shift. For each shift the records for the truck, fleet, operator, material type, source, quantity, and payload associated to each plotted dump can be accessed. For location and velocity plots display the truck position and speed for a given day and/or shift. For a dig plot, display all shovel and/or bucket positions for each load.

Other capabilities include:

Grade-weighted averages and load summaries for the selected shovels are also available. Load summaries include truck number, shovel number, operators, material type, face, block, and destination.

View stockpile qualities. Identify homogeneous sub-zones by zooming into a section of a stockpile to get accurate readings of all

dump qualities and quantities for a particular time frame.

For more information contact Wenco International Mining Systems Ltd. 200 - 10711 Cambie Road, Richmond, B.C. Canada V6X 3G5. Tel: 604-270-8277 ext 204. Fax: 604 - 270-9770. Web: *www.wencomine.com*.

Galena

GALENA is a powerful slope stability analysis system developed by geotechnical engineers for geotechnical, mining and civil engineers who want to solve geotechnical problems quickly and easily. GALENA incorporates three methods of stability analysis so you can assess a wide range of ground and slope stability problems in both soils and rocks:

The BISHOP Simplified method for circular failure surfaces; the SPENCER-WRIGHT method for both circular and non-circular failure surfaces; the SARMA method for problems where non-vertical slices are required.

For more information contact Clover Technology, PO Box 20, Robertson NSW 2577 Australia. Ph: +61 2 4888 2022. Fax: +61 2 4888 2033. E-mail: *Galena@acenet.com.au* Web: *www.clovertechnology.com.au* *http://galena.clovertechnology.com.au*

TIDBITS

GRG Corporation, developers of the StratiFact software, is actively looking for another company or individual either buy the software outright or lease the intellectual property rights. They will also partner with someone to continue development and improvement of the software. The owners are planning to retire. For more information contact Jaimie Gallegos, Stratifact Software, 8300 W. 17th Ave., Lakewood CO 80215. 303-423-0221 or 800-783-0250. Fax: 303-423-8757. e-mail: *sales@stratifact.com*. Web: *www.stratifact.com.*

The December 2001 issue of **World Mining Equipment** comes with the 2002 Buyer's Guide on a CD ROM. For more information: *www.wme.com*

Micromine Pty Ltd and MineMAX Resource Optimisation Technologies have signed a Memorandum of Understanding to sell and market all MineMAX products. engineer with a user-friendly, fast tool for determining optimal pits and performing strategic analysis. MineMAX software includes SCHEDULER, PLANNER, and iGantt. For more information visit *www.micromine.com.au* and *www.minemax.com*. See Earth Science Computer Applications October 2001 for more information about MineMAX.

Find 2300 suppliers of construction and power transmission products at the CONEXPO-CON/AGG 2002 and IFPE 2002. Visit the Virtual Trade Show to preview these industry expositions. Web sites: *www.conexpoconagg.com* and *www.ifpe.com*.

ESRI offers Web-based courses for their products, including ArcGIS Desktop, ArcInfo, ArcView GIS. Applications courses are also offered for natural resources and other fields; GIS fundamentals; professional practice; and spatial analysis. On-line courses are ideal for motivated individuals who want or need flexibility in their training schedule or location and for those who cannot take time away from work to attend traditional classes. A typical Virtual Campus course includes three to six learning modules consisting of concepts, examples, hands-on exercises, challenges, and exams for reinforcing the content. Everything needed to complete the courses and earn official ESRI certificates of completion is available online, and some courses include downloadable trial editions of ESRI software. Visit *campus.esri.com* for course descriptions and other information. A few of the courses are free and for some the first module is free.

Carlson Software recently acquired C & G Software Systems, which will operate as a division of Carlson. All C & G products will continue to be available to customers. The C & G division of Carlson will provide technical support, training and all services previously provided by C & G. Dean Goodman, a co-founder of C & G, will assume responsibility for the C & G division of Carlson and will be directing development of several data collection products. He will be based in Carlson's Boston development facility. C & G was founded in 1979 by Ed Cowherd and Dean Goodman. It provides CAD and data collection software to the land surveying industry. Carlson Software provides CAD and data collection software for the land surveying, civil engineering, mining, and machine control industries. Carlson has offices in Kentucky, Massachusetts, and California. On the Web: *www.carlsonsoftware.com*

MEETINGS and WORKSHOPS

January 24-25, 2002. Special Institute on Water Quality and Wetlands - Regulations & Management in the Development of Natural Resources. Contact Mark Holland, Rocky Mountain Mineral Law Foundation, 9191 Sheridan Blvd., Suite 203, Westminster, CO 80031. tel 303-321-8100, ext. 106 fax 303-321-7657 e-mail: *mholland@rmmlf.org www.rmmlf.org*.

January 27-30, 2002. Tailings and Mine Waste '02. Fort Collins, Colorado. Linda L. Hinshaw, Department of Civil Engineering, Colorado State University, Fort Collins CO 80523-1372. 970-491-6081. Fax: 970-491-3584. E-mail: *lhinshaw@engr.colostate.edu*. Web: *www.tailings.org*.

February 10-13, 2002. 18th Annual Conference on Explosives & Blasting Technique 2002. Las Vegas NV. ISEE, 30325 Bainbridge Rd., Solon OH 44139.. Phone: 440-349-4400. Fax: 440-349-3788. Web: *www.isee.org*.

February 10-14, 2002. Symposium on the Application of Geophysics to Environmental and Engineering Problems SAGEEP 2002. Las Vegas, Nevada. Environmental and Engineering Geophysics Society. (EEGS),720 S. Colorado Blvd., Suite 960-S, Denver, CO 80246. Phone: 303-756-3143. Fax: 393-691-9490.

February 25-27, 2002. ECOM+ SME Annual Meeting and APCOM Conference. Phoenix AZ. Society for Mining Metallurgy and Exploration, P.O. Box 625002, Littleton CO 80127-5002.

March 6-7, 2002. The 15th High Altitude Revegetation Workshop. Fort Collins, Colorado. High Altitude Revegetation, Gary L. Thor, Dept. of Soil and Crop Sciences, Colorado State University, 200 W. Lake St., Fort Collins CO 80523. 970-484-4999. E-mail: *garythor@lamar.colostate.edu*. Web: *www.highaltitudereveg.com*.

March 6-8, 2002. Fifteenth High Altitude Revegetation Workshop. Fort Collins, Colorado. Office of Conference Services, Colorado State University, Fort Collins, CO 80523-8037. Phone: 970-491-7501. Fax: 970-491-7747. Web: *http://kiowa.colostate.edu/csuconferencereg.*

March 10-13, 2002. PDAC 2002. Toronto Canada. Prospectors & Developers Association of Canada, 34 King St. East, 9th Floor, Toronto ONT Canada M5C 2X8. Tel: 416-362-1969. Fax: 416-362-0101. E-mail: *info@pdac.ca*. Web: *www.pdac.ca*

March 11-12, 2002. Environmental Isotopes in Ground Water Resource and Contaminant Hydrogeology. Denver, Colorado. National Ground Water Association, Attn: Registrations #497, Dept. 481, Columbus OH 43265-0481. 800-551-7379, 614-898-7791. Fax: 614-898-7786. Web: *www.ngwa.org/education*.

March 11-12, 2002. Environmental Data Management Using MS Access, SQL Server, and

the Internet. Denver, Colorado. National Ground Water Association, Attn: Registrations #497, Dept. 481, Columbus OH 43265-0481. 800-551-7379, 614-898-7791. Fax: 614-898-7786. Web: *www.ngwa.org/education*.

March 17-20, 2002. GITA's 25th Annual Conference (Geospatial Information and Technology Association). Tampa, Florida. GITA, 14456 E. Evans Ave., Aurora CO 80014. Web: *www.gita.org*.

March 19-23, 2002. Conexpo-Con/Agg. Las Vegas NV. Conexpo-Con/Agg, 111 East Wisconsin Ave, Suite 1000, Milwaukee WI 53202-4806. 414-272-0943. 800-867-6060. Fax: 414-272-2672.

March 25-26, 2002. Coalbed and Coal Mine Methane Conference. Denver, CO. Strategic Research Institute, 236 W. 27th St., 8th Floor, New York NY 10001. Tel: 646-336-7030 or 888-666-8514. Fax: 646-336-8591. *www.srinstitute.com*

April 8-12, 2002. Mintec Seminar 2002. Tucson AZ. Mintec Inc., 3544 E. Ft. Lowell Rd., Tucson AZ 85716-1705. 520-795-3891. Fax: 520-325-2568. E-mail: *Fred.F@mintec.com*. Web: *www.mintec.com*.

April 10-12, 2002. MEMS Eleventh Annual Conference - Reshaping the Minerals and Metals Industry. Montreal Canada. Office of Special Programs & Continuing Education, 1600 Arapahoe, CSM Annex, Golden CO 80401. 303-273-3321. Fax: 303-273-3314. E-mail: *space@mines.edu*.

April 24-26, 2002 Third International Conference on Management Information Systems Incorporating GIS and Remote Sensing. Halkidiki, Greece. Gabriella Cossutta, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton SO40 7AA UK. 44 (0) 238 029 3223. Fax: 44 (0) 238 029 2853. E-mail: *gcossutta@wessex.ac.uk*. Web: *www.wessex.ac.uk.*

April 30-May 2, 2002. Coal Prep 2002. Lexington, KY. Primedia Business Exhibitions, 5680 Greenwood Plaza Blvd., Suite 300, Greenwood Village, CO 80111. 1-800-288-8606. 1-303-741-2901. Web: *www.coalprepshow.com*.

May 6-9, 2002. OTC 2002: Deep into the Future. Houston TX. Offshore Technology Conference, P.O. Box 833868 Richardson TX 75083-3868. Fax: 972-952-9435. E-mail: *tech-prog@otcnet.org*.

May 6-8, 2002. Envirosoft 2002. Bergen, Norway. Lucy Southcott, Wessex Institute of Technology, Ashurst Lodge, Ashurst, Southampton SO40 7AA UK. 44 (0) 238 029 3223. Fax: 44 (0) 238 029 2853. E-mail: *lsouthcott@wessex.ac.uk*. Web: *www.wessex.ac.uk.*

May 7-11, 2002. EXPOMIN 2002. Santiago, Chile. Marketing International Corp. 200 N. Glebe Rd., Suite 915-Arlington VA 22203. Tel: 703-527-8000. Fax: 703-527-8006. E-mail: *ppenab@micespos.com*.

May 20-22, 2002. Seventh International Conference on Remote Sensing for Marine and Coastal Environments. Miami, Florida. Veridian International Conferences, P.O. Box 134008, Ann Arbor, MI 48113-4008. 734-994-1200 ext. 3234. Fax: 734-994-5123. E-mail: *nancy.wallman@veridian.com*. *www.erim-int.com/CONF/marine/MARINE.html*.

June 9-13, 2002. Reclamation with a Purpose. Lexington KY. Dr. Richard Barnhisel, American Society of Mining and Reclamation, 3134 Montavesta Rd., Lexington KY 40502-3548. Voice & Fax: 877-701-2086. E-mail: *rbarnhis@ca.uky.edu*.

Earth Science Computer Applications

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