B Kimberlites: where ?

B1
EVALUATION OF GEOPHYSICAL TECHNIQUES FOR DIATREME DELINEATION IN THE COLORADO-WYOMING KIMBERLITE PROVINCE

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Kimberlite diatremes in northern Colorado and southern Wyoming are generally characterized by poor exposure due to truncation by erosion surfaces and presence of ubiquitous colluvial and(or) soil cover. Ground geophysical methods may be used in conjunction with geological mapping to delineate diatreme contacts. Magnetic surveys reveal that most diatremes are characterized by small positive dipolar anomalies. Convolution of magnetic data and removal of regional magnetic gradients allow for delineation of diatreme boundaries. Electrical resistivity and conductivity (electromagnetic) surveys show that kimberlitic soils are generally 5-10 times more conductive than granitic soils. The broadside EM method was effective for locating kimberlite contacts in areas of modest soil cover whereas kimberlite covered by as much as 25 meters of surficial material could be detected using the VLF method. Radioactivity surveys were effective only in areas where soil cover is thin to absent. Gravity and refraction seismic methods were ineffective in determining diatreme contacts because of a common lack of appreciable contrasts in density and elasticity of kimberlite and host granites. Magnetic, electrical resistivity, and electromagnetic methods clearly are the most effective geophysical techniques tested for delineating kimberlite contacts in the Colorado-Wyoming kimberlite province. (Study supported by grants from the Rocky Mountain Energy Company and the Geological Soc. of America)

B2
A TELEDETECTIVE STUDY OF KIMBERLITE REGIONS IN N. AMERICA, E. AFRICA, AND SIBERIA

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Teledetective evaluation involves the integrated use of remote sensing, geomorphological and geophysical data planes to depict the surface and subsurface character of provinces that occur in extremely different environments. Study areas in Colorado-Wyoming, Tanzania and Yakutia were chosen on the basis of their diversity: e.g. elevation (2400m, 1200m, 300m, respectively), climate (temperate, equatorial, arctic), country rock (granite, granite, limestone), and floral cover (montane forest, grassland, taiga). Through the analysis of similarly scaled Landsat images (infrared reflectance), aeronautical maps (drainage patterns and topography), and geophysics (mass distribution and magnetic variation), the teledetective approach permits several related but distinct aspects of a given kimberlite province to be considered simultaneously and to be compared to other known or suspected kimberlite provinces, in terms of tectonic grain and specific textural and(or) structural features.

The technique indicates that the Colorado-Wyoming State Line Kimberlite District, the Mwadui region, and the Mir region all seem to be characterized by some type of cross-cutting textural signature where the regional trend is interrupted or intersected by another trend. Pretorius (1981) suggests that diamondiferous kimberlites in southern Africa tend to occur at the intersection of extensive anteclisal concentric and radial patterns. Assuming that the textural interference patterns observed in this study also reflect deep-seated zones of structural disturbance (e.g. intersecting fault systems) that could provide conduits for the ascent of kimberlite magma, such features may have value in delineating favorable target areas in kimberlite exploration programs.

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B3
GEOBOTANICAL EXPRESSION OF A BLIND KIMBERLITE PIPE, CENTRAL INDIA

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Vegetation growing over a blind kimberlite pipe in central India was employed to explore the possibility of using it as an additional tool for searching hidden kimberlite pipes in areas indicated by geophysical prospecting. Hinota pipe (24°39'N: 80°02'E) intrusive into the Precambrian quartz arenite is largly in an undisturbed state and is therefore an appropriate choice for this study.

Whereas the undergrowth over the quartzitic