GEOTOURISM POTENTIAL OF THE VREDEFORT DOME, SOUTH AFRICA – CHALLENGES, OPPORTUNITIES, PROGRESS AND RECOMMENDATIONS. R.L. Gibson1 and M. Blom2, 1Impact Cratering Research Group, School of Geosciences, University of the Witwatersrand, P/Bag 3, P O WITS, Johannesburg 2050, South Africa, roger.gibson@wits.ac.za; 2Fezile Dabi District Municipality, Box 10, Sasolburg 1947, South Africa.

Introduction: The Vredefort Dome is a 90-km-wide geological entity located ~120 km southwest of Johannesburg, South Africa, that represents the eroded central uplift of the world’s oldest (2023 ± 4 Ma) and possibly largest known meteorite impact structure. It is a site of unprecedented geological significance not only because of the impact-related effects visible in its rocks, but also because it is one of only a handful of areas around the world that exposes a near-continuous, >25 km deep, crustal section.

The topographic expression of the dome is restricted to its northern and western sectors (the remainder being covered by younger sedimentary strata), with the most prominent feature being a crescent of steep ridges and valleys cut by the Vaal River. The combination of the spectacular rugged scenery and the Vaal River has created a well-established tourism industry that is primarily focussed on recreational and adventure tourism and the business market. By contrast, geotourism linked to the spectacular geological features is relatively minor, being restricted to a few information displays in resorts and ad hoc tours run by local enthusiasts and academics. In 2005, a 30000 ha portion of the dome (approximately one-quarter of the exposed area of the dome) was inscribed as a World Heritage Site (VDWHS) on the strength of the dome’s international geological significance.

Challenges: The most significant challenges to the development of the geotourism potential of the Vredefort Dome relate to its immense size and the deep levels of erosion, and to the land ownership profile in the dome. In the first instance, the large size presents an interpretive challenge as visitors cannot drive or walk up to a single viewpoint from which they can see the entire structure, such as is possible, for instance, at Tswaing crater. Second, large distances may need to be travelled between different geosites, which makes it difficult for the visitor to maintain perspective. The deep levels of erosion also create confusion about the size of the feature – the crescent of hills defining the Vredefort Mountainland is commonly confused with the crater rim because visitors are looking for a classic bowl-shaped crater. Whereas previously the Vredefort Dome was often mistaken as the Vredefort crater, additional confusion has arisen recently among visitors who equate the WHS area with the Vredefort crater. The deep levels of erosion, which have completely removed the crater topography and most of the tell-tale breccias and impact deposits, also mean that any explanation of the geological significance of particular features requires lengthy explanation if first-time visitors are to build an understanding of the Vredefort impact event. Logistically, the fact that 89% of the land in the WHS is privately owned, with many absentee owners, creates a challenge for access to key sites, as well as issues such as accident liability.

Progress: Following the WHS inscription in 2005, provincial and district and local municipal structures have embarked on several projects aimed at enhancing the geotourism potential of the VDWHS and the larger dome region, including a 3-year roads programme aimed at upgrading much of the 145 km of gravel road in the WHS. A Strategic Environmental Assessment (2006) and an Integrated Management Plan (2007) were completed for the North West and Free State Province governments, respectively. These assessments have considered the VDWHS holistically, examining other resources (archaeological, cultural, biodiversity) and other challenges to development and management of the natural resources, including pollution, access, communication and socio-economic and legal aspects. The Free State government has sponsored additional projects aimed at addressing some of the challenges presented by the geology of the dome. These include the distribution of information pamphlets and accompanying posters outlining the geological features that are freely available to visitors and locals (in English, Afrikaans and Sesotho), and a summary brochure outlining the main conclusions of the 2000-page Integrated Management Plan, as well as posters for public display. A geological guidebook and audiovisual presentation are also planned. The Fezile Dabi District Municipality has built a Visitor and Geological Interpretation Centre outside Vredefort town that, once completed in 2009, will address the challenges of explaining to visitors the problems of scale and erosion depth that characterise the Vredefort impact structure as well as showcasing other geological features of the dome. This centre will also provide a hub for the development of local crafts industries, thereby allowing economic upliftment through small enterprise development, and should become a key tourism site in its own right.

Recommendations: Several key initiatives have already been set in motion to address the dissemination of information concerning the geological heritage resources of the Vredefort Dome. One of the acknowledgements of the IMP is that the selection of only a small portion of the dome as a WHS (for historical as well as logistical reasons) presents new management
challenges, and the possibility of creating a UNESCO Geopark covering the rest of the dome and several key geosites presently outside of the VDWHS must receive serious consideration. Geotourism also needs to be managed within the context of the other attractions of the area. Specifically, the dome area contains a wide range of habitats that have promoted a broad floral biodiversity, and the re-introduction of large game animals by the tourism sector is strengthening the faunal biodiversity once more. Additionally, the area contains a highly diverse archaeological and cultural-historical heritage, ranging from Stone Age San-Bushman petroglyphs and tool-making sites to extensive Iron Age settlement ruins, traces of the earliest European settler dwellings, an historic goldfield and several key sites related to the Anglo-Boer War of 1899-1900. In contrast to the geology, these resources have received little attention from researchers and require immediate attention so that suitable heritage sites may be identified for tourism purposes.

The private ownership of much of the land raises issues of access to key geosites. The Management Authority will need to assess a variety of measures, including purchase of land and facilitation of access (re-aligning fences, stiles, gates); however, an alternative that may need to be considered is the creation of roadside stops that allow easy access to visitors and that can be arranged in a story format, with visitors progressing from one stop to the next in a specific order. If placed strategically between proper outcrop geosites, these ‘artificial’ sites can allow visitors to learn about the geological aspects of the dome at the same time as enjoying scenic views and information about cultural and heritage resources. Consideration should also be given to enhancing the value of specific sites of cultural and biodiversity significance by emphasizing nearby geological features. Owners of tourist establishments should also be encouraged to enhance hiking, riding and biking trails for their guests with geological information.

Much of the value of enhanced geotourism in the Vredefort Dome to the local population will lie in the tourism support industries (accommodation, catering). Given its close proximity to Johannesburg and the excellent road links, the challenge is to get visitors to view the Vredefort Dome as an overnight destination, rather than just a day-visit site. The creation of an interest in the geological resources, together with the opportunity to explore cultural and biodiversity resources and engage in a range of adventure activities can, if properly packaged, achieve this goal. With the necessary visitor numbers, additional job creation linked directly to the tourist experience (properly trained museum and field guides and educational officers) will create additional benefits.

Aside from the local and international tourism market, the Vredefort Dome is ideally placed to align itself as a first-choice destination for field school educational activities serving the highly populace Gauteng region. At present, such activities involve a combination of adventure activities (hiking, rafting, abseiling) with ecological awareness activities. By presenting a combination of geological and cultural heritage-based learning activities in addition to this standard format, a more holistic educational programme can be presented that will set it apart from its competition.

**Conclusions:** The Vredefort Dome is an area of superlative geology, rare scenic beauty, rich biodiversity and cultural heritage that is located close to South Africa’s major international gateway and largest population centre. Development and effective management of its geological and other heritage resources as a tourism and educational resource has the potential to uplift an economically-depressed region and act as a flag-bearer for the development of other geological heritage resources in South Africa. A joint marketing initiative with the other principal tourist attractions of the Gauteng region (Cradle of Humankind, Origins Centre, Apartheid Museum) will strengthen its international profile.