

Paper Number: 3821

## Geoscience and Indigenous Knowledge: Lightning and the Lowveld Lavender

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The Nelspruit environs in Mpumalanga fall within the extreme risk category for lightning in South Africa, experiencing more than 60 thunderstorm days per year [1]. The thunderstorms are the product of warm maritime air flowing in over the coastal plains from the Indian Ocean, with orographic uplift associated with the Drakensberg escarpment adding to convective processes in the hot summer months. These thunderstorms result not only the highest flash densities in the country, but this area also has a high risk of positive lightning which frequently is responsible for starting fires or causing death [1]. For people living in this area, lightning and the damage it can do is a real and frequent hazard.

Indigenous people around the world have developed understandings and practices associated with the weather. Beliefs associated with lightning include how to protect yourself and your property and even how to divert storms that might lead to damage or death [2]. The Shangaan communities living in the Hazyview / Bushbuckridge area of the Lowveld are no exception and practices such as covering mirrors in the house during thunderstorms [3] are commonly followed. Indigenous architecture and building materials make traditional homes particularly vulnerable: conical thatched roofs, often gathered at the apex with a metal cone, provide not only a contact point for lightning but plenty of fuel for a fire. Palmer & Pitman [2] record that several indigenous trees are traditionally used for protection, with twigs or branches of specific species being pushed into the roof thatching, or cut into stakes and driven into the ground around the dwelling as prevention against a strike.

One of the commonly known trees associated in this area with attracting lightning is the iconic naboom, *Euphorbia ingens* [4]. It grows on the slopes of rocky outcrops derived from the granitoid batholiths of the Nelspruit suite (Kapaal craton). The granite has been found to carry abundant uranium and thorium [5], and in weathering, breaks down to produce radon gas. Radon and its positively charged decay products are known to contribute to atmospheric electricity [6]. Radon is exhaled through the sandy soils and fissures in the rock into the atmosphere, and because it is heavier than air, accumulations are thought to add to the conditions near the ground that may attract lightning strikes. A study in Australia [7] highlights that trees also contribute significantly to local concentrations of radon through transpiration. The trees draw up groundwater charged with radon and release it into the atmosphere, especially at the hottest times of the day - which is also when thunderclouds are building up. It may not only be their height, then, which makes trees a target for lightning.

While this association would need to be investigated in the Lowveld where the naboom grows, a more intriguing localized indigenous belief, as yet undocumented, holds that *Heteropyxis natalensis*, commonly known as the Lowveld Lavender tree because of the smell of its leaves when crushed, is the most powerful indicator of lightning. Local inhabitants between Hazyview and Bushbuckridge claim that "if you build near where *inKhunzi* grows, your house will be burnt down by lightning". Here the association appears to correlate with localised dyke swarms, with diabasic minerals providing a localised habitat for the lavender tree and also attracting lightning. Thus the apparent myth may have a solid foundation in geoscience.

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