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## When Wind Blows

Yondela Nqadala (Renu-Karoo) and Gina Arena (SAEON Arid Lands Node)

Water is one of the most fundamental elements in sustaining life on earth. Even in the arid Karoo regions, it is undeniable that rainfall is the driver of ecosystem structure and function. Extended periods of below average rainfall have a negative impact on economic development through agriculture and water resources. But what can we learn about the bellowing strong winds that so often seem to blow the rain clouds away; and can we know which winds might bring rain to Prince Albert?

It is a common belief that the dry, southerly winds do not bring rain to Prince Albert. An investigation was conducted to study the relationship between rainfall and wind direction to validate this point. Using a decade long (2006 - 2016) weather data set from Tierberg Long Term Ecological Research Site\* we analyzed the percentage of north and south winds that do not bring rain, those that bring less than 2mm of rain and those that bring more than 2mm of rain.

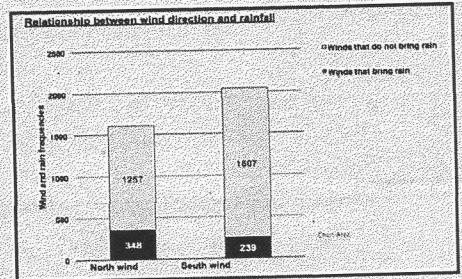
Prince Albert receives a very sparse, below national average rainfall, but there is a strong relationship between rainfall and wind direction. Rainfall varies with windfall direction, which in

turn varies with season and comes frequently in the late summer season. Studying wind-rainfall relationships can be difficult and often confusing. Therefore it is important to remember that the Prince Albert rainfall is part of a much larger weather system that is also influenced by the oceans and mountain ranges

We discovered that it is true that northerly winds bring a significant amount of rainfall in a year compared to southerly winds. Northerly winds flow from Zambia, Zimbabwe, northern Botswana and part of Namibia where warm and moist air is lifted up and condenses. Then, as it meets the cooler conditions in the sky, clouds are formed. These clouds are blown all the way down south and bring us rain.

From our findings, we can show that even though there are more winds coming from the South, only 10% of south winds bear rain, compared to 20% of northerly winds. A large majority of southerly wind rain is intercepted by the Swartberg Mountains. This has a barrier effect bringing mostly dry winds to Prince Albert.

The trend between north and south wind proportion bringing more than 2mm of rain



Graph showing the frequencies of north and south winds with their observed amount of rainfall.

does not display any significance. This means that major rainfall events may be expected with both north and south prevailing winds. But it is not easy to say which wind system brings a dry clear weather system, so both north and south prevailing winds may bring no rain.

\* The site (30km east of Prince Albert) is run by the South African Environmental Observation Network (SAEON). Weather data collection is just one of the ways that SAEON tracks the impact of climate change and land use. ■

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