



## **Climate variability as a threat for countries progressing towards malaria elimination: The case study of Peru**

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Malaria cases reported by the Peruvian Ministry of Health demonstrate a 61% reduction of malaria in the last decade (2001- 2010). However, during the years 2011-14 malaria increased by  $\sim 2.7$  folds in Peru and  $\sim 5$  folds in Loreto, an Amazonian department that continues contributing over 90% of the malaria cases in Peru. Past studies have indicated that there is a strong association between climate variability and malaria rates. The purpose of this study is to test the hypothesis that climate variables have played a key role in the recent increase of malaria cases in Peru. Climate data, such as precipitation, temperature, humidity and surface pressure simulated by the NASA MERRA model during a 10-year long time series (2004-2013) are used to verify this hypothesis. Preliminary data analyses show large deviations from the 10-year mean (i.e. climatological anomalies) in humidity, surface pressure, and temperature during 2010 up to four times larger than previous and subsequent years. An increase of 8% in precipitation yearly averages is observed in 2010, which also corresponds with the following reverse of the downward trend of malaria incidence, particularly in Loreto. The sudden amplification of climatological anomalies in 2010 could have set the environmental conditions that caused the re-emergence of malaria in 2011. Investigation is underway to link weekly malaria data from different districts in Peru to the climate conditions at those locations during the past ten years. This will be crucial in understanding why some countries, despite all necessary efforts, are unable to completely eliminate malaria.