



## Solar UV radiation and human health: an evaluation of high UV index measurements performed in South America

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Public health policies on skin cancer and solar protection overexposure in South America (SA) are generally based on the traditional scientific literature. As the most part of these studies was developed by North American and European researchers, they do not reflect particularities observed in SA. Ultraviolet Index (UVI) scale (introduced by Environment Canada in 1992 and extended worldwide by WHO, going from Low 1-2 values up to Extreme 11+ values) and medical recommendations are important examples. Recent measurements performed in different sites of SA show that in the most part of the year, extreme UVI measurements ( $UVI > 11$ ) are very frequently registered since the first hours up to the last hours of the day. For example, in São Paulo, Brazil ( $23.5^{\circ}S$ ;  $46.5^{\circ}W$ ; 850 m), 35% of UVI values measured within 2 hours around noon time are in the extreme scale with measurements closer to 15. In Arica, Chile ( $18.7^{\circ}S$ ;  $70.3^{\circ}W$ ; 25 m), mean monthly UVI measurements collected at local noon between 2006 and 2010 showed are closer to 13 during several months. Other significant results were registered in La Quiaca, Argentina ( $22.1^{\circ}S$ ;  $65.6^{\circ}W$ ; 3460 m), La Paz, Bolivia ( $16.3^{\circ}S$ ;  $68.1^{\circ}W$ ; 3800 m) and Ponta Negra beach, a touristic coastal site located in the Northeastern Brazilian city of Natal, Brazil ( $5.0^{\circ}N$ ;  $34.0^{\circ}W$ ; sea level). In La Quiaca, values near 20 were measured by the Argentina National Weather Service. In La Paz, UVI closer to 10 were registered at 8 am (local hour) and UVI up to 20 were observed at noon and during an experimental campaign performed in January 2010. In Ponta Negra beach, measurements performed between 9:30 and 9:50 (local hour) registered  $UVI > 10$  and between 10h40 and 12h00 in the range of 11 and 13. It was measured an accumulated erythemal dose of 5250 J/m<sup>2</sup>, corresponding to 25 MED (Minimal Erythemal Doses) for skin type II, between 9:30 and noon.

These results will serve as a basis for the establishment of a possible correlation with skin cancer incidence, as was done for Caucasian population in USA by Scotto and Fraumeni (1981) using results of the National Skin Cancer surveys. According to the Brazilian National Cancer Institute (INCA), non-melanoma skin cancer represents about 25% of more than 550,000 cancer cases annually diagnosed in Brazil, with significant social and economic consequences. However, medical recommendations on skin care do not reflect the extreme UVI values observed in most part of the continent, in different seasons and different times of the day. For instance, a traditional recommendation “you should avoid the sun between 11 and 16 h” (Vanicek et al., 2000), regularly used in medical campaigns, is not enough time interval to a satisfactory protection in most part of SA countries. Other subjects that needs to be analyzed with care (mainly due to the low income of a large fraction of the population that work outside exposed to high solar UV radiation) are: measurements of the clothes, hats and sunglasses that are commonly used for protection; proposal for a legislation that protect outdoor workers, standardization of a new qualification scale, considering the same definition for the UV index as is internationally used, but adapting the qualification words Low to Extreme, to the regional situation, like is done at present in Argentina. In the present communication, we introduce the way in which we will develop the project and we will present results of extreme values of the UV index in South America along the hours of the day and the day of the year, that give support to our proposal for a detailed study of the solar UV radiation and its relation with skin cancer. In order to arrive to these objectives, we propose also to reinforce the collaboration between SA researchers, adapt the educational programs to our reality and promote multidisciplinary interaction.