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DECENNIAL TIME SERIES ESTIMATES OF TROPOPAUSE HEIGHTS ON GLOBAL SCALE BY MEASUREMENTS OF BENDING ANGLES SUFFERED BY GNSS SIGNALS THROUGH THE ATMOSPHERE

Abstract

Variability in the heights of the tropopause (TH) – the atmospheric layer between the troposphere and the stratosphere – is deemed as a relevant fingerprint of climate changes, strongly related to the global warming of the troposphere. TH depends by stratosphere–troposphere energy and matter exchanges. In particular it is affected by the over-shooting in the stratosphere of water vapor coming from the warmed troposphere occurring at the tropics . For these reasons, monitoring of tropopause altitudes and determination of possible local/global trends of them are extremely important for climate investigations.

In this work we will perform an investigation about the global behaviour of tropopause in a period from 2006 to 2020; i.e since when COSMIC costellation is flying. COSMIC is a joint Taiwan-USA space mission devoted to GNSS Radio Occultation (GNSS-RO) . For this investigation we adopt a definition of tropopause height based on the presence of bumps in bending angle profiles (BA) provided by GNSS-RO as described in [1]. It was demonstrated that the ways to determine tropopause heights from GNSS-RO bumps can uniquely determine TH in a sharper way than the lapse rate or the cold point definition. We are confident that the huge amount of COSMIC data available in the period-2006-2020 will allow to perform an exhaustive and robust analysis of the climate trends through the tropopause behaviour study on global scale. Bibliography [1] Vespe, F.; Pacione, R.; and Rosciano, E. “A Novel Tool for the Determination of Tropopause Heights by Using GNSS Radio Occultation Data”, Atmospheric and Climate Sciences, 2017,7, pp. 301-313.