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Dynamics of the middle atmosphere as observed by the ARISE project

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The atmosphere is a complex system submitted to disturbances in a wide range of scales, including high frequency sources as volcanoes, thunderstorms, tornadoes and at larger scales, gravity waves from deep convection or wind over mountains, atmospheric tides and planetary waves. These waves affect the different atmospheric layers submitted to different temperature and wind systems which strongly control the general atmospheric circulation. The full description of gravity and planetary waves constitutes a challenge for the development of future models of atmosphere and climate. The objective of this paper is to present a review of recent advances obtained in this topic, especially in the framework of the ARISE (Atmospheric dynamics Research InfraStructure in Europe) project