NO$_2$ from SCIAMACHY limb and nadir measurements - validation of the operational data products

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SCanning Imaging Absorption spectroMeter for Atmospheric CHartograpY (SCIAMACHY), aboard Envisat, 2002-2012, observed the transmitted, scattered and reflected solar radiation from the earth's atmosphere in limb, nadir and solar/lunar occultation geometries covering UV-Visible to NIR (240-2830 nm) spectral range with a moderate spectral resolution of 0.2-1.5nm. Monitoring the stability and verifying the quality of its decadal scale products is a prerequisite to their usage for long term analysis and interpretations, as well as stratospheric ozone studies and assessments. With this perspective, the ESA project SCILOV-10 (SCIAMACHY long term validation 2010) aims at the lifetime validations and documentation of the quality of various operational data products retrieved from SCIAMACHY in limb and nadir geometries. The limb observations provide vertically resolved global coverage and the nadir measurements give vertical column amounts on the same coverage scale. NO$_2$ plays an important role in the stratospheric ozone chemistry by controlling the ozone abundances through catalytic destruction or by mitigating ozone depletion through reservoir formation. In the troposphere its concentration determines the ozone amount. Here we present the validation results of the operational limb stratospheric NO$_2$ profiles and the nadir NO$_2$ total column products. The limb dataset is compared with the corresponding scientific SCIAMACHY retrievals at the Institute of Environmental Physics (IUP) Bremen and with correlative measurements form other satellites as ACE-FTS, HALOE, SAGE II and OSIRIS. The nadir product is validated with the corresponding IUP measurements and with GOME NO$_2$ data product.