INTEGRAL observations of the Vela region focussing on Vela X-1

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The INTEGRAL satellite observed the Vela region in the X-ray and gamma-ray energy bands during 1.5 Ms between November and December 2005 in the context of our accepted INTEGRAL open-time observation proposal. We present first results of the data analysis, including in particular a spectral and temporal study of the eclipsing high-mass X-ray binary Vela X-1. Thanks to this long-term observation we could update the system parameters and obtain new ephemeris. A precise orbital ephemeris is important for the study of this system, since it allows to determine detailed time-resolved spectra during the eclipse ingress and egress phases in different energy bands, and to monitor details of the companion wind. In addition we derived the time-averaged spectrum of the source, investigating the presence of cyclotron resonant scattering features (CRSF). Orbital and pulse-phase resolved spectroscopy have been performed to understand the underlying physics of the high-energy emission. We studied the variation of the pulse morphology with energy and time. At high energy the profile shows a primary and a secondary peak. Using a relativistic description of the polar-cap emission of the neutron star, we fitted the double-peaked pulse profile in order to model the pulsed flux in energy and constrain the system geometry.