Geophysical Research Abstracts
Vol. 18, EGU2016-15092, 2016
EGU General Assembly 2016

Detection and characterization of small hot fires: Comparing FireBird, BIRD, S-NPP VIIRS and MODIS capacities over gas flares

Gernot Ruecker (1), Wilfrid Schroeder (2), Eckehard Lorenz (3), Johannes Kaiser (4), and Alexandre Caseiro (4)

(1) ZEBRIS GbR, Munich, Germany (gruecker@zebris.com), (2) University of Maryland, College Park, USA (wschroed@umd.edu), (3) German Aerospace Centre (DLR), Berlin, Germany (eckehard.lorenz@dlr.de), (4) Max-Planck-Institute for Chemistry, Mainz, Germany (j.kaiser@mpic.de)

According to recent research, black carbon has the second strongest effect on the earth climate system after carbon dioxide. In high Northern latitudes, industrial gas flares are an important source of black carbon, especially in winter. This fact is particularly relevant for the relatively fast observed climate change in the Arctic since deposition of black carbon changes the albedo of snow and ice, thus leading to a positive feedback cycle.
Here we explore gas flare detection and Fire Radiative Power (FRP) retrievals of the German FireBird TET-1 and BIRD Hotspot Recognition Systems (HSRS), the VIIRS sensor on board of the S-NPP satellite, and the MODIS sensor using temporally close to near coincident data acquisitions. Comparison is based on level 2 products developed for fire detection for the different sensors; in the case of S-NPP VIIRS we use two products: the new VIIRS 750m algorithm based on MODIS collection 6, and the 350 m algorithm based on the VIIRS mid-infrared I (Imaging) band, which offers high resolution, but no FRP retrievals.
Results indicate that the highest resolution FireBird sensors offer the best detection capacities, though the level two product shows false alarms, followed by the VIIRS 350 m and 750 m algorithms. MODIS has the lowest detection rate. Preliminary results of FRP retrievals show that FireBird and VIIRS algorithms have a good agreement. Given the fact that most gas flaring is at the detection limit for medium to coarse resolution space borne sensors – and hence measurement errors may be high - our results indicates that a quantitative evaluation of gas flaring using these sensors is feasible. Results shall be used to develop a gas flare detection algorithm for Sentinel-3, and a similar methodology will be employed to validate the capacity of Sentinel 3 to detect and characterize small high temperature sources such as gas flares.