

# Dangers of nanoparticle emissions in the vicinity of airport



Remigiusz Jasiński, Jacek Pielecha, Jarosław Markowski

Institute of Combustion Engines and Transport  
Poznan University of Technology, Poland



## Introduction

The issue of emissions from internal combustion engines attracted a lot of interest in the scientific community and engage the public because of the known association between exposure to multiple air pollutants and short and long-term consequences for human health. In addition, exhaust emission may affect the deterioration of visibility and directly or indirectly affect the climate. Nowadays more and more attention is paid to the emissions in areas of airports, due to the rapid increase in the volume of air transport and the outlook for further development in order to meet transportation needs for the subsequent years. Although emissions of particulate mass have been studied since the beginning of the creation of emission standards, the question of particle number and their size distribution is a matter innovative. The work presents the issue of particulate emissions from passenger planes and their impact on air pollution in the vicinity of the airport. Studies were carried out in the area adjacent to the airport Poznan-Lawica. The measurement of particle concentration was performed four times during the landing of aircraft equipped with jet engines. Total concentration and size distribution of particle were subject of analysis. It was found that during the single landing operation the particle concentration increases several dozen-fold.

## Methodology

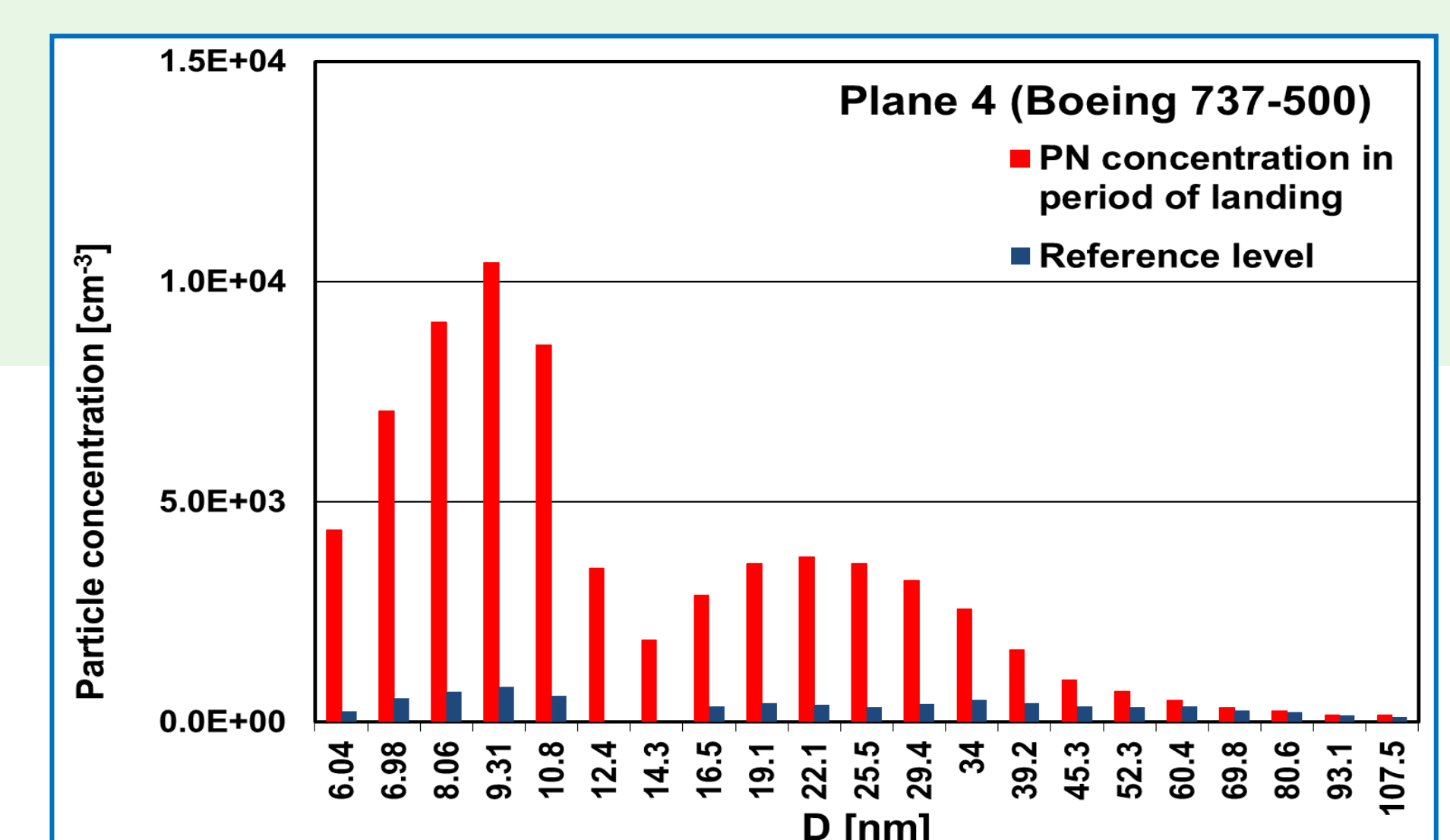
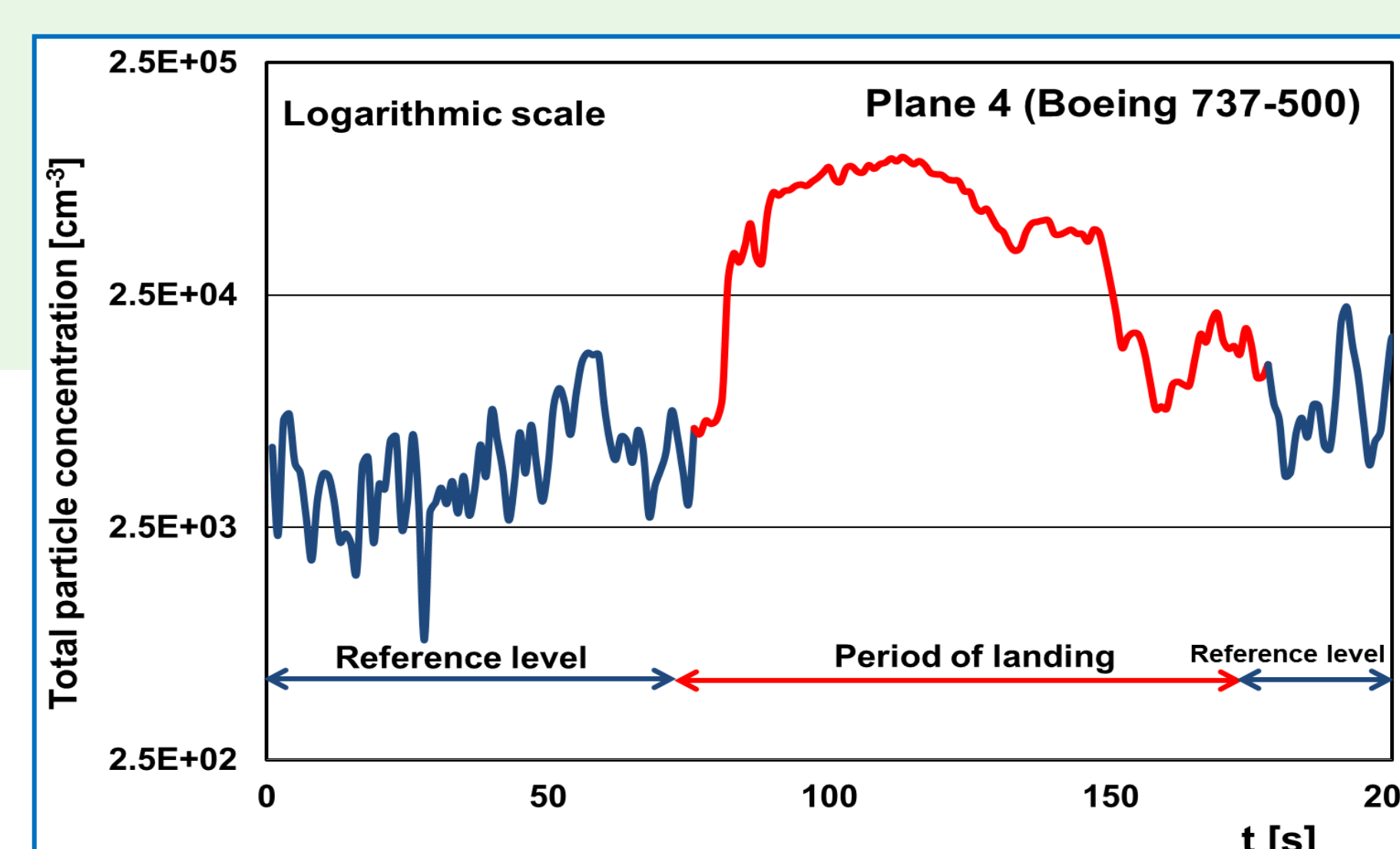
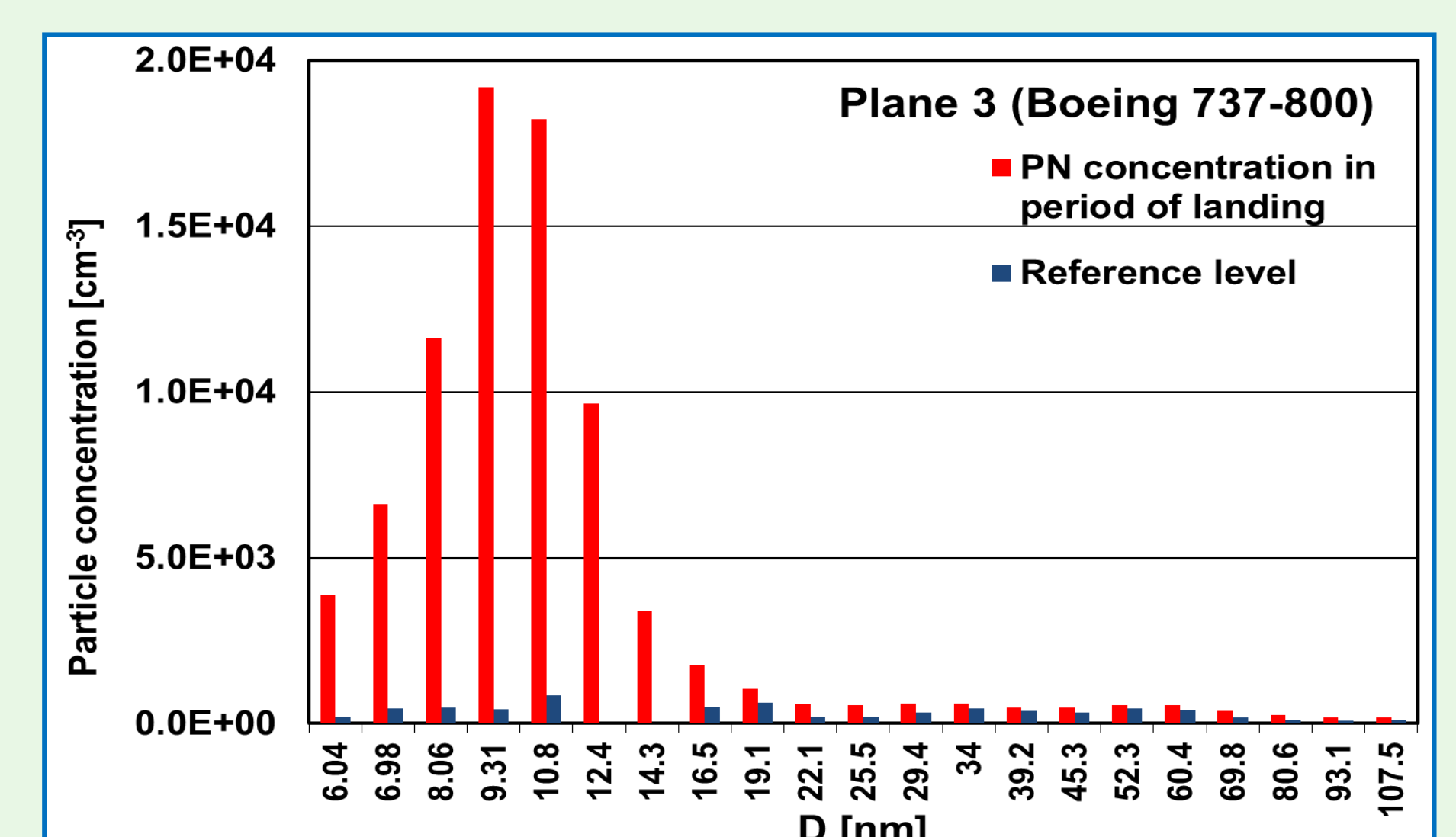
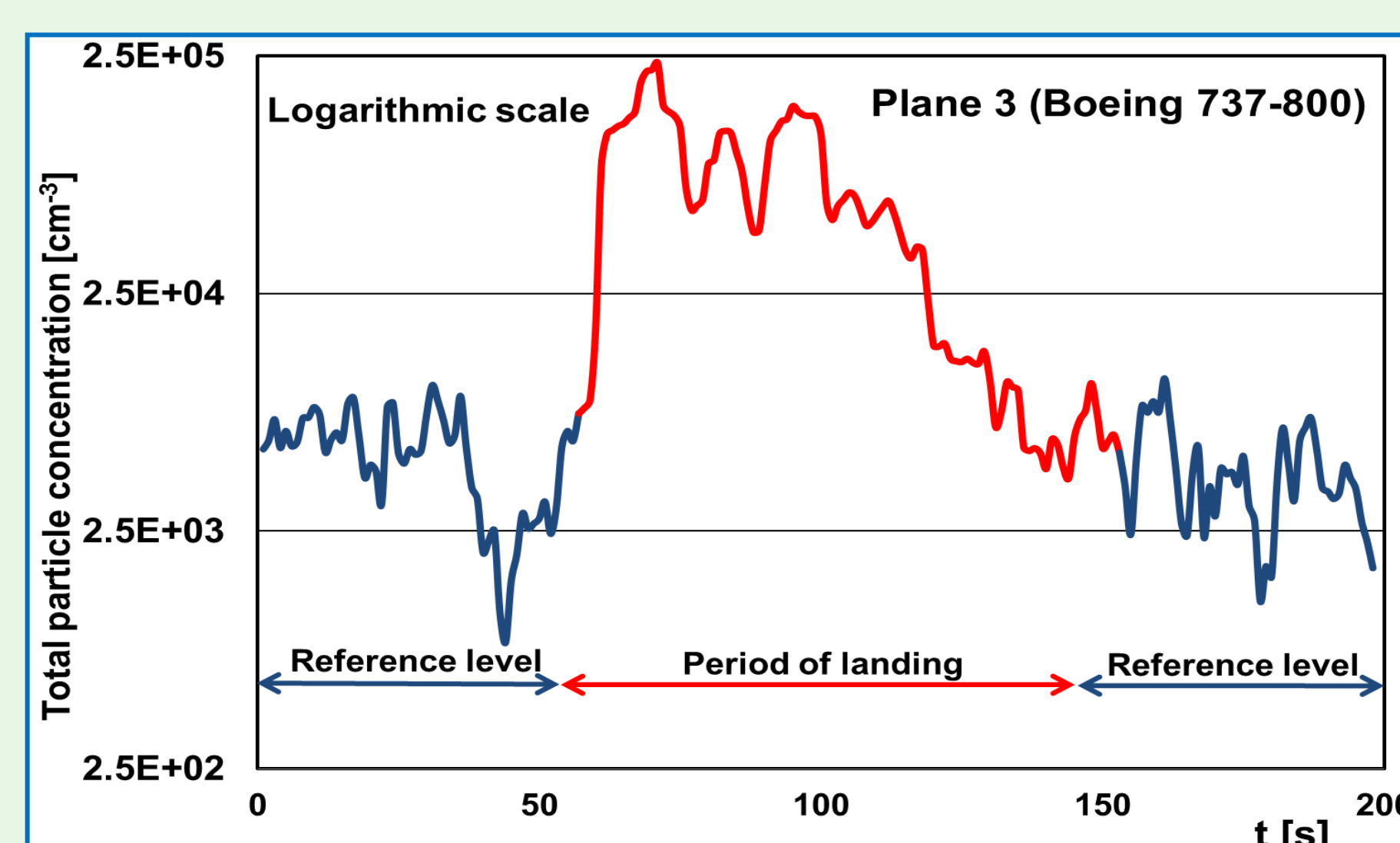
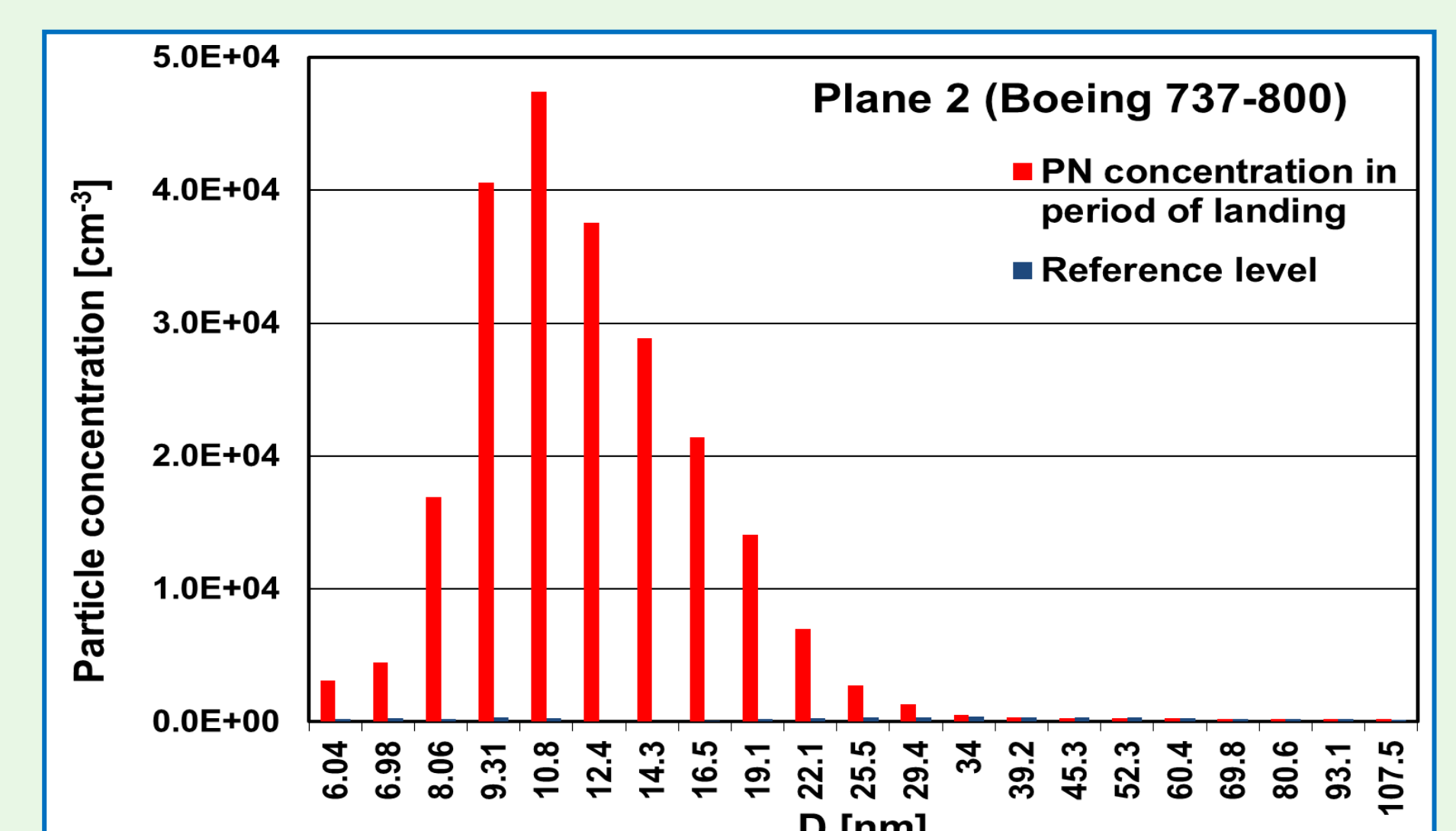
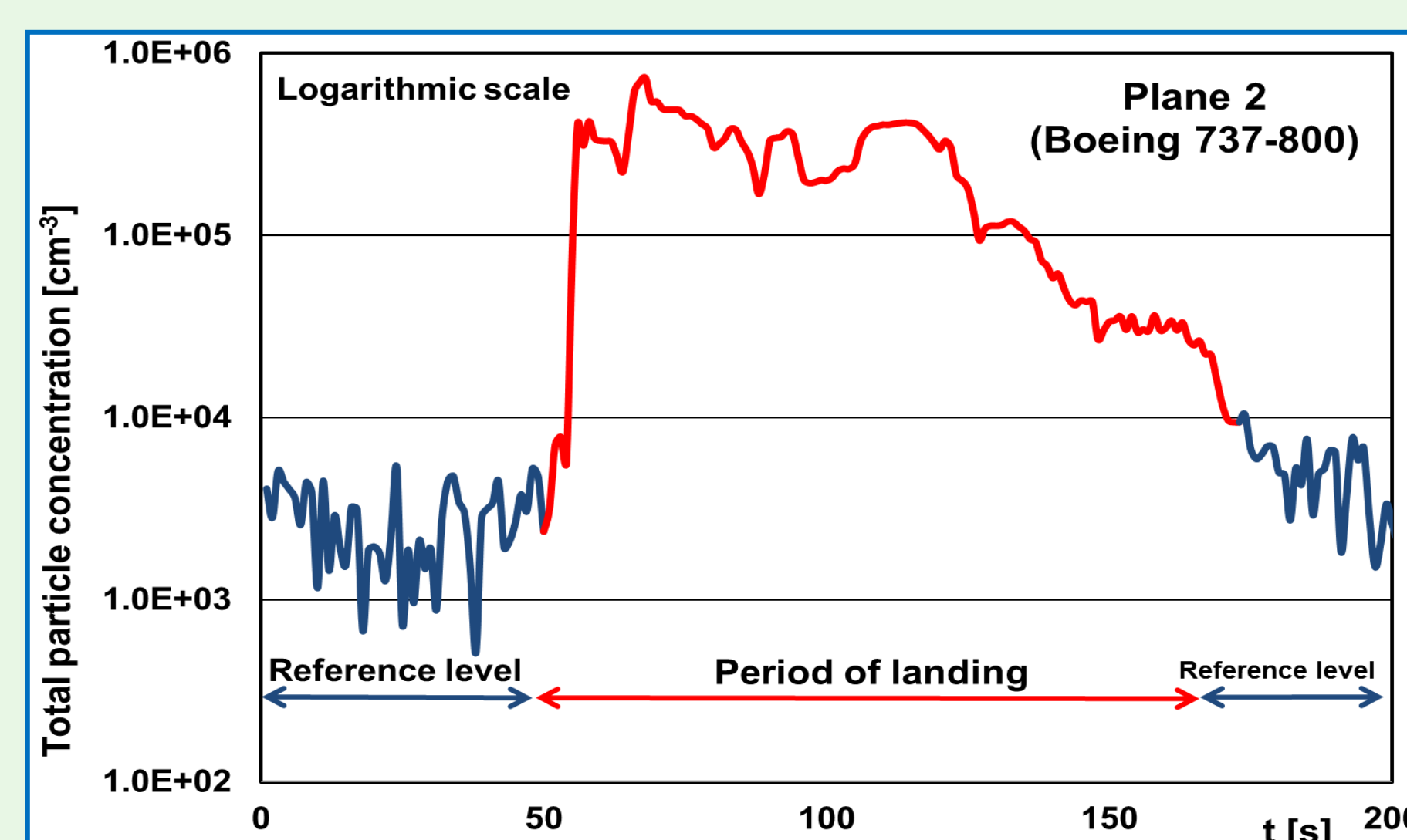
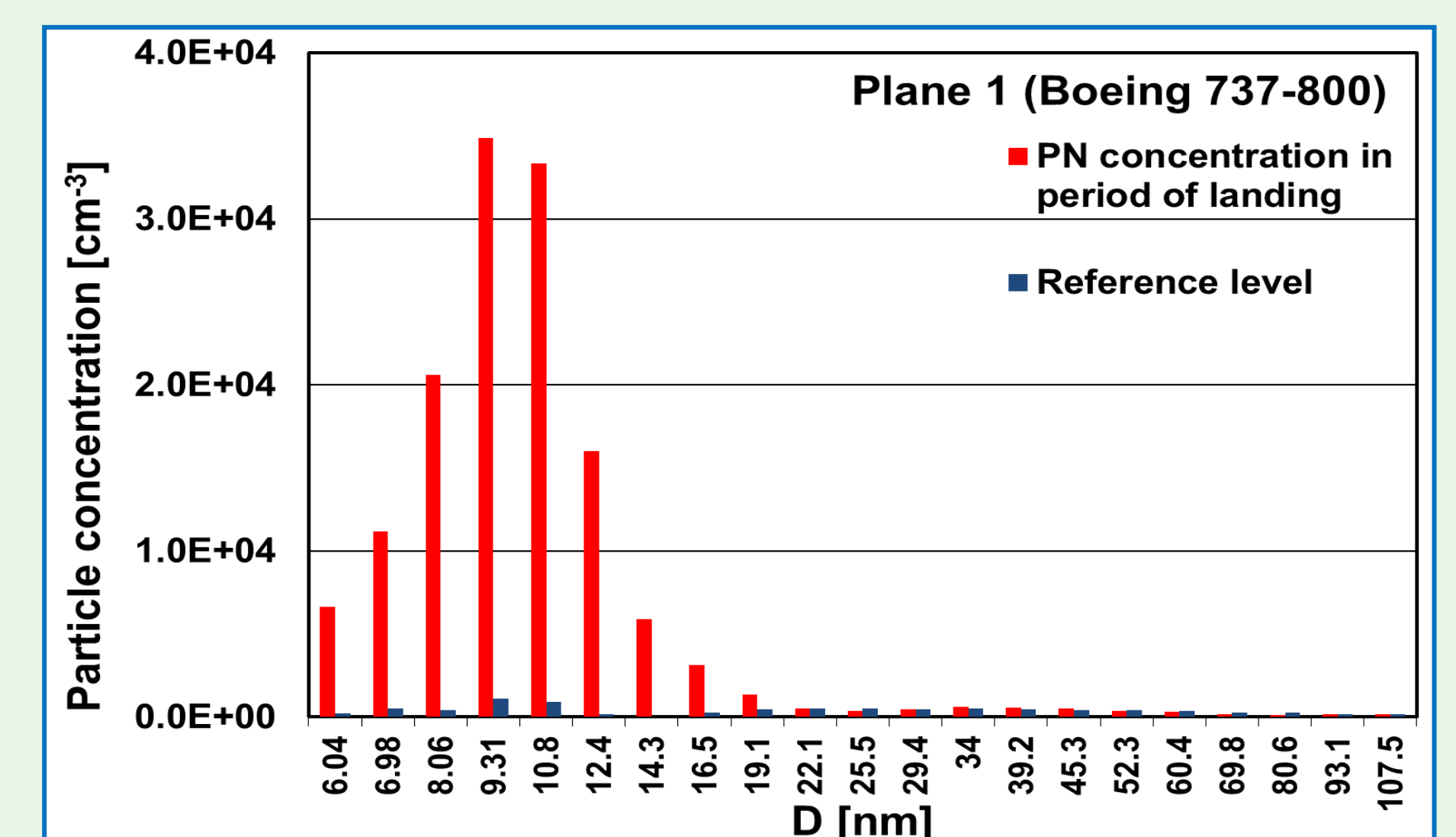
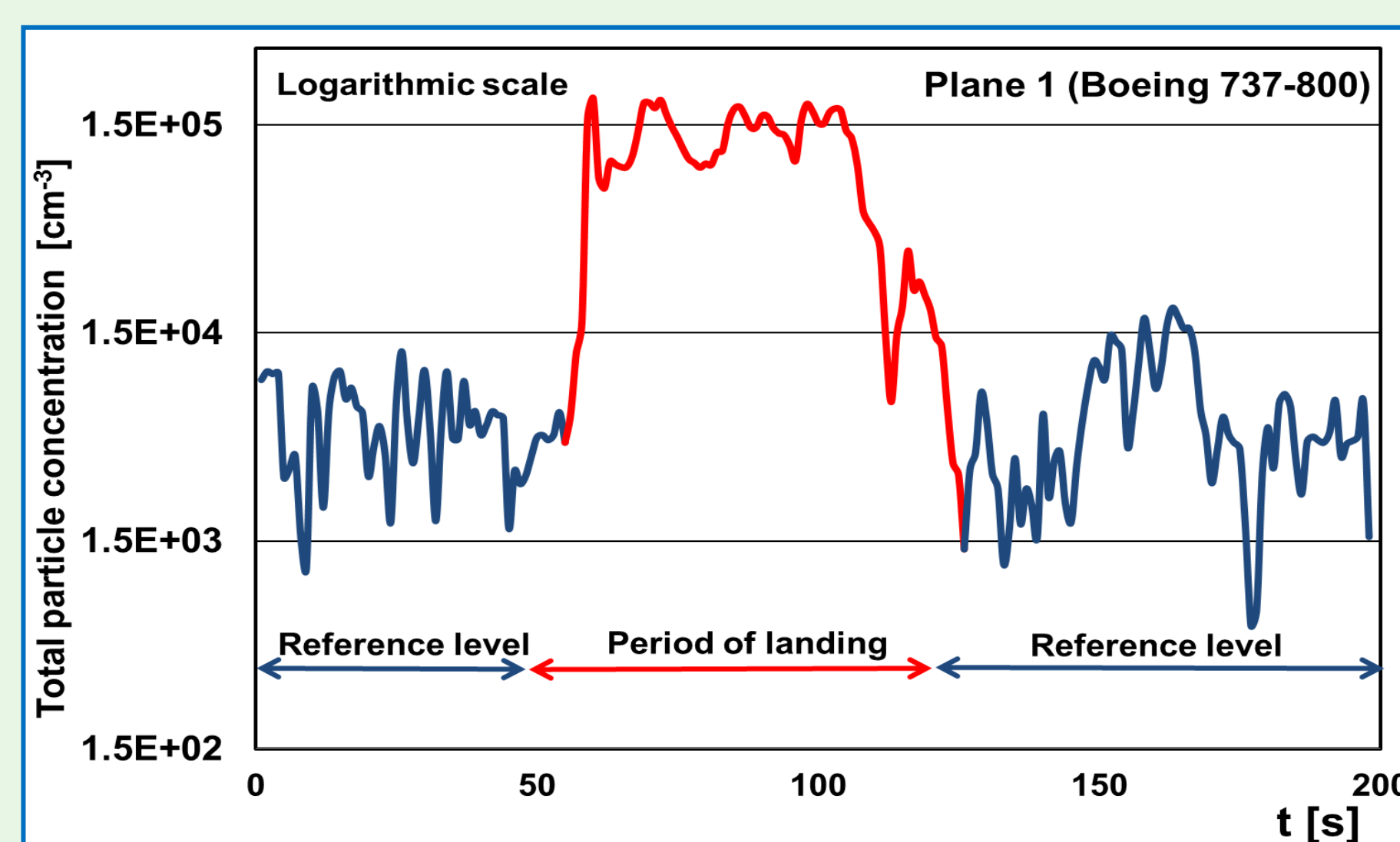
The objects of tests were cruise passenger aircraft, Boeing 737-800 and Boeing 737-500.



For measuring the size distribution of particle number and their total concentration in the air a mass spectrometer TSI Incorporated – EEPS 3090 (Engine Exhaust Particle Sizer Spectrometer) was used.



## Results



## Summary

The measured particle size distributions indicate that particles emitted by the aircraft engines are characterized by a set of dimensions in the range of 5-40 nm. This fact is significant that these particles are the most harmful to human health. There were found significant differences in particle size distribution depending on the type of jet engine. Measurement were carried out at a distance of about 2 km from the touchdown of aircraft. It suggests that the areas of the runway, taxiways and aprons can be much more polluted than the area where the studies were conducted. This is particularly important in the context of ground handling.