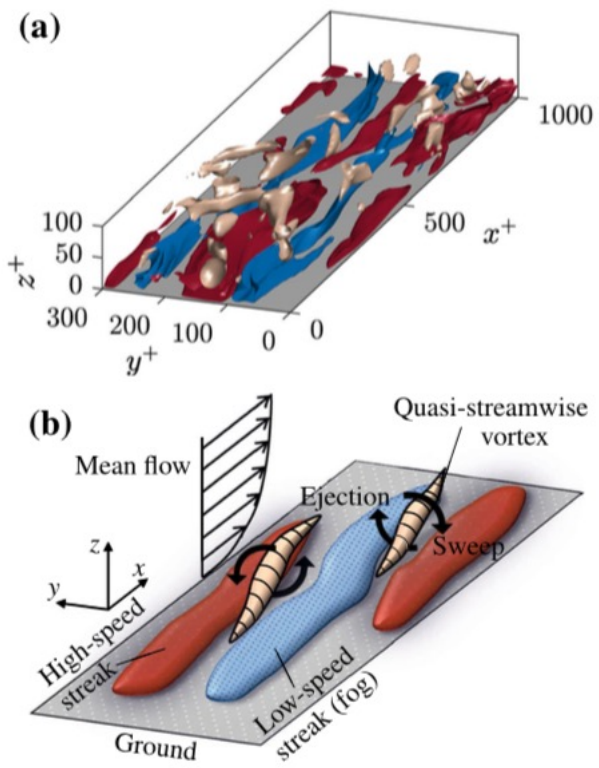
National Aeronautics and Space Administration
Jet Propulsion Laboratory
California Institute of Technology

Direct Numerical Simulation (DNS) of Turbulence and Fog



a) *DNS snapshot of isosurfaces of high- and low-speed streaks (red and blue) and quasi-streamwise vortices (tan).* ***b)*** *Sketch of these near-ground streaks and vortices, and of the mechanism leading to increased liquid water in low-speed streaks.*

Science Question: What is the role of turbulence in fog and stratified PBL cloud formation?

Results: We performed the first Direct Numerical Simulation (DNS) of fog and we discovered a mechanism for fog formation where regions of condensation form within low-speed streaks.

Significance: Parameterizations of fog and stratified PBL cloud formation in weather and climate models are highly uncertain. Our study will be used to build faithful parameterizations of fog and PBL clouds.

MacDonald, M, MJ, Kurowski & J Teixeira, 2020: Direct Numerical Simulation of the Moist Stably Stratified Surface Layer: Turbulence and Fog Formation. *Boundary-Layer Meteor.* **175,** 343–368.