

**Impact of Atmospheric River Reconnaissance Dropsonde Data on the Assimilation of Satellite Data in GFS**

M. Zheng<sup>1\*</sup>, L. Delle Monache<sup>1</sup>, X. Wu<sup>2</sup>, B. Kawzenuk<sup>1</sup>, F.M. Ralph<sup>1</sup>, Y. Zhu<sup>3</sup>, R. Torn<sup>4</sup>, V.S. Tallapragada<sup>5</sup>, Z. Zhang<sup>1</sup>, K. Wu<sup>2</sup>

<sup>1</sup>Center for Western Weather and Water Extremes, Scripps Institution of Oceanography, University of California San Diego, La Jolla, California

<sup>2</sup>I. M. Systems Group Inc. at National Oceanic and Atmospheric Administration (NOAA) National Centers for Environmental Prediction (NCEP)/ Environmental Modeling Center (EMC), College Park, Maryland

<sup>3</sup>National Aeronautics and Space Administration (NASA)/Goddard Space Flight Center (GSFC), Greenbelt, Maryland

<sup>4</sup>University at Albany, State University of New York, Albany, New York

<sup>5</sup>NOAA NCEP / EMC, College Park, Maryland

\*Corresponding author: Name: Minghua Zheng, Email: mzheng@ucsd.edu, Tel: +1 858-534-1819.

**Contents of this file**

Tables S1 to S2

**Additional Supporting Information (Files uploaded separately)**

**Table S1.** List of conventional and remotely sensed data assimilated in the experiments with the GDAS system at NCEP.

**Table S2.** List of AR Recon IOPs in 2020 and the targeted analysis dates. All the model analyses are at 0000 UTC.

## Introduction

This supporting material includes two supplemental tables to summarize the observation types assimilated in the experiments (Table S1) and to list the dates for 17 IOPs during 2020 AR Recon (Table S2). We consider that this information will provide additional detailed contents for readers.

Conventional data	Remotely sensed data
AR Recon flight-level and dropsondes <sup>1</sup> Aircraft/Pilot reports (AI/PIREP) Commercial aircraft <ul style="list-style-type: none"> <li>- Aircraft Communications Addressing and Reporting system (ACARS)</li> <li>- Aircraft Meteorological Data Relay (AMDAR)</li> </ul> Radiosondes (fixed land, ship, and mobile land) Other reconnaissance flight-level and dropsondes (RECCO) except for AR Recon data Synoptic stations Coastal-Marine Automated Network (C-MAN) Tide gauge Ships and buoys (drifting and moored)	Atmospheric Motion Vectors (AMVs) Spaceborne GPS radio occultation (RO) Next Generation Weather Radar (NEXRAD) wind The Advanced Scatterometer wind (ASCAT) The Advanced Microwave Sounding Unit-A (AMSU-A) onboard Metop-A, Metop-B, Metop-C, N15, N18, N19 Atmospheric Infrared Sounder (AIRS) on Aqua Cross track infrared sounder (CRIS) on N20, npp Infrared Atmospheric Sounding Interferometer (IASI) The Special Sensor Microwave Imager/Sounder (SSMIS) on f17 Geostationary Operational Environmental Satellite (GOES) – Sounder The Advanced Baseline Imager (ABI) on GOES-R series (only monitoring) Ozone Monitoring Instrument (OMI) Global Ozone Monitoring Experiment (GOME)
<sup>1</sup> <i>This dataset is not assimilated in the Deny experiments.</i>	

**Table S1.** List of conventional and remotely sensed data assimilated in the experiments with the GDAS system at NCEP.

IOPs	Dates	IOPs	Dates
2020IOP1	24 Jan 2020	2020IOP10	21 Feb 2020
2020IOP2	29 Jan 2020	2020IOP11	24 Feb 2020
2020IOP3	31 Jan 2020	2020IOP12	2 Mar 2020
2020IOP4	4 Feb 2020	2020IOP13	7 Mar 2020
2020IOP5	5 Feb 2020	2020IOP14	8 Mar 2020
2020IOP6	6 Jan 2020	2020IOP15	9 Mar 2020
2020IOP7	14 Feb 2020	2020IOP16	10 Mar 2020
2020IOP8	15 Feb 2020	2020IOP17	11 Mar 2020
2020IOP9	16 Feb 2020		

**Table S2.** List of AR Recon IOPs in 2020 and the targeted analysis dates. All the model analyses are at 0000 UTC.