SCAR-B

Smoke Cloud And Radiation - Brazil

AUG. 15 - SEPT. 14, 1995

E L E M E N T S

ER-2:
MAS, AVIRIS imaging spectrometers, lidar

C131:
in situ aerosol, trace gas, CCN and cloud measurements, aerosol optical properties, radiation, lidar

INPE Bandierante - aerosol in situ, aerosol optical properties, radiation

US Forest service
monitored emission from individual fires

U-Arizona,
surface vegetation properties, remote sensing through smoke

AERONET
network of sun/sky radiometers, aerosol optical thickness and size distribution

U-Wisconsin
GOES imagery and NMC trajectory analysis

U-Sao Paulo
aerosol sampling, operations

U-Alaska
aerosol size distribution and CCN spectra

6. Smoke <--interaction--> clouds

Cloud properties, deviation from plane parallel, effects of clouds on smoke, effect of smoke on cloud drop size and reflectance: MAS, AVIRIS, AVHRR.

7. Remote sensing

Remote sensing of aerosol, water vapor, clouds
Remote sensing of vegetation through smoke
Atmospheric corrections

Planned analysis:

1. Fires:

Statistics of thousands of fires (thermal signature, thermal energy smoldering/flaming) MAS, AVIRIS, ground views

2. Smoke emission from fires:

MAS and AVIRIS remote sensing, relation to fire property
In situ emissions from specific fires

3. Smoke properties:

Size distribution (function of the smoke age), chemistry, CCN spectrum

4. Smoke life time, transport, evolution

Models + specific measurements + GOES and AVHRR and validate against MAS and C131 and Bandierante in situ measurements.

5. Smoke-radiation-fluxes-forcing

smoke size distribution
--> optical in situ properties
--> radiance
--> fluxes

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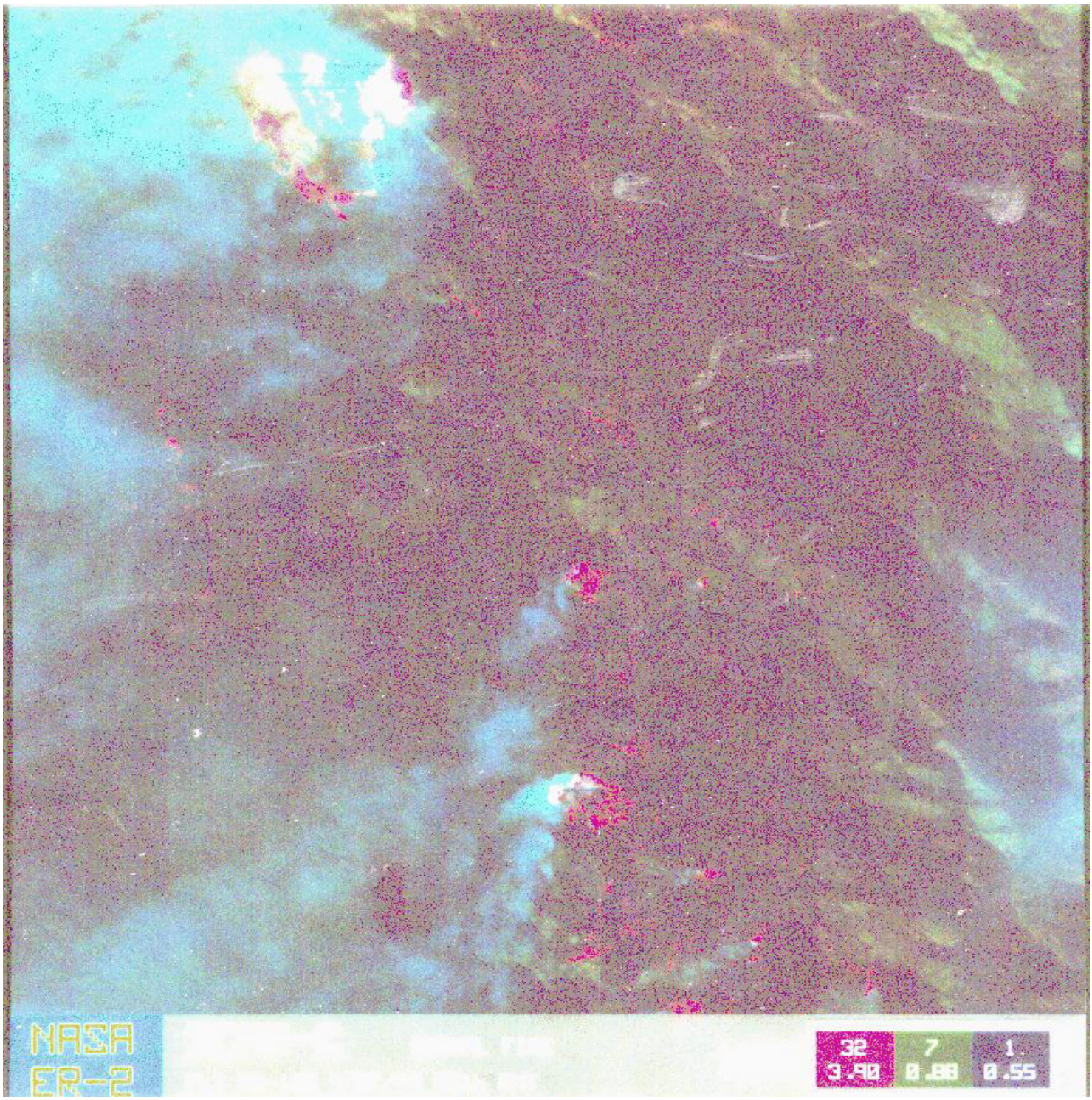
- All elements of the mission worked
- Excellent collaborations between the US investigators, the Brazilian scientists and air force observers
- One of the smokiest years (ER-2 flew thousands of kms not seeing the ground)
- MAS data from 70 ER-2 hrs x 700 km x 40 km x 50 channels, 15 hrs of AVIRIS data

General goal:

Characterization of the effect of biomass burning on the atmosphere


NASA
ER-2
32
3.90
7
0.88
1
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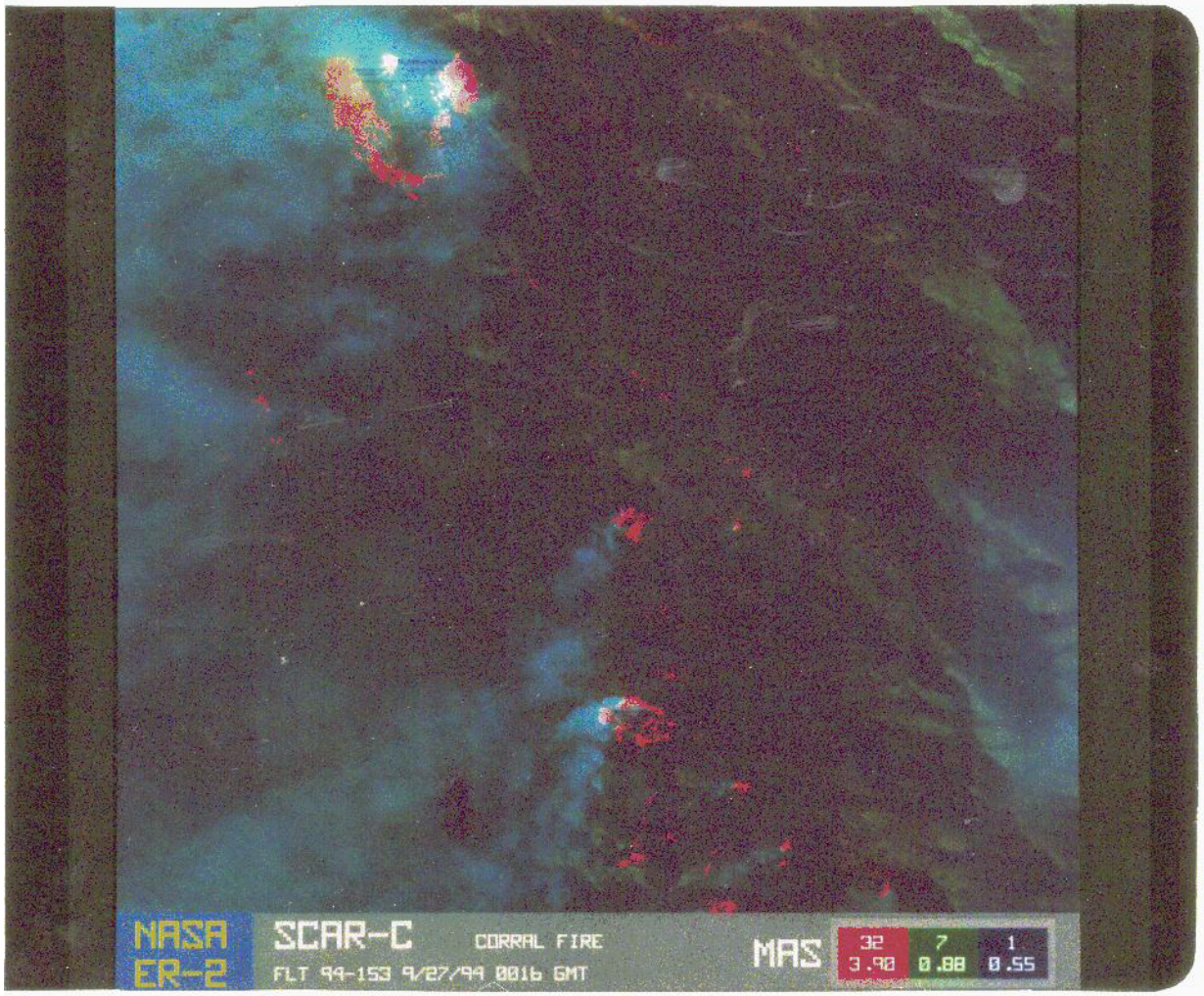
NASA
ER-2
SCAR-C
CORRAL FIRE
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MAS
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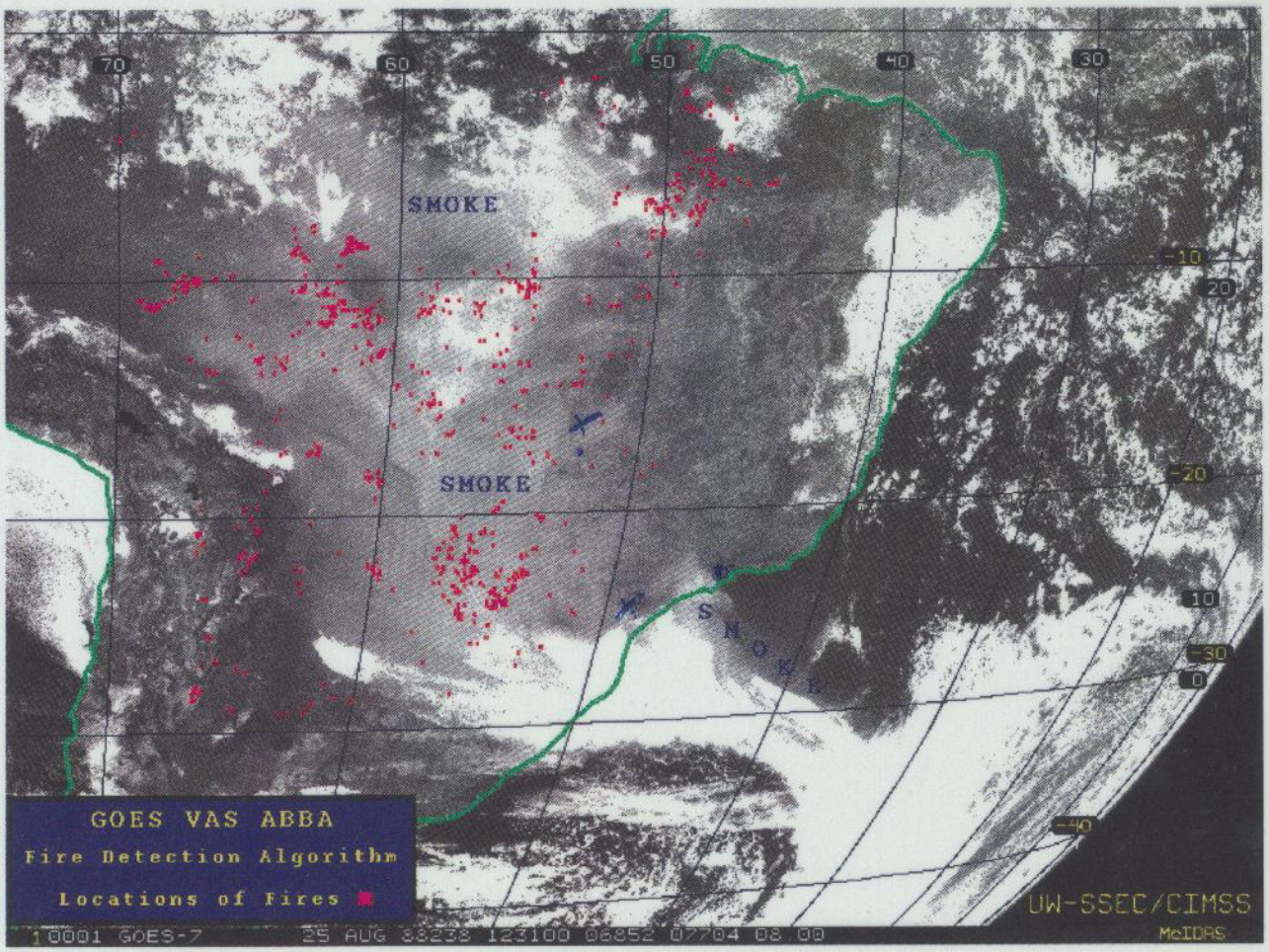
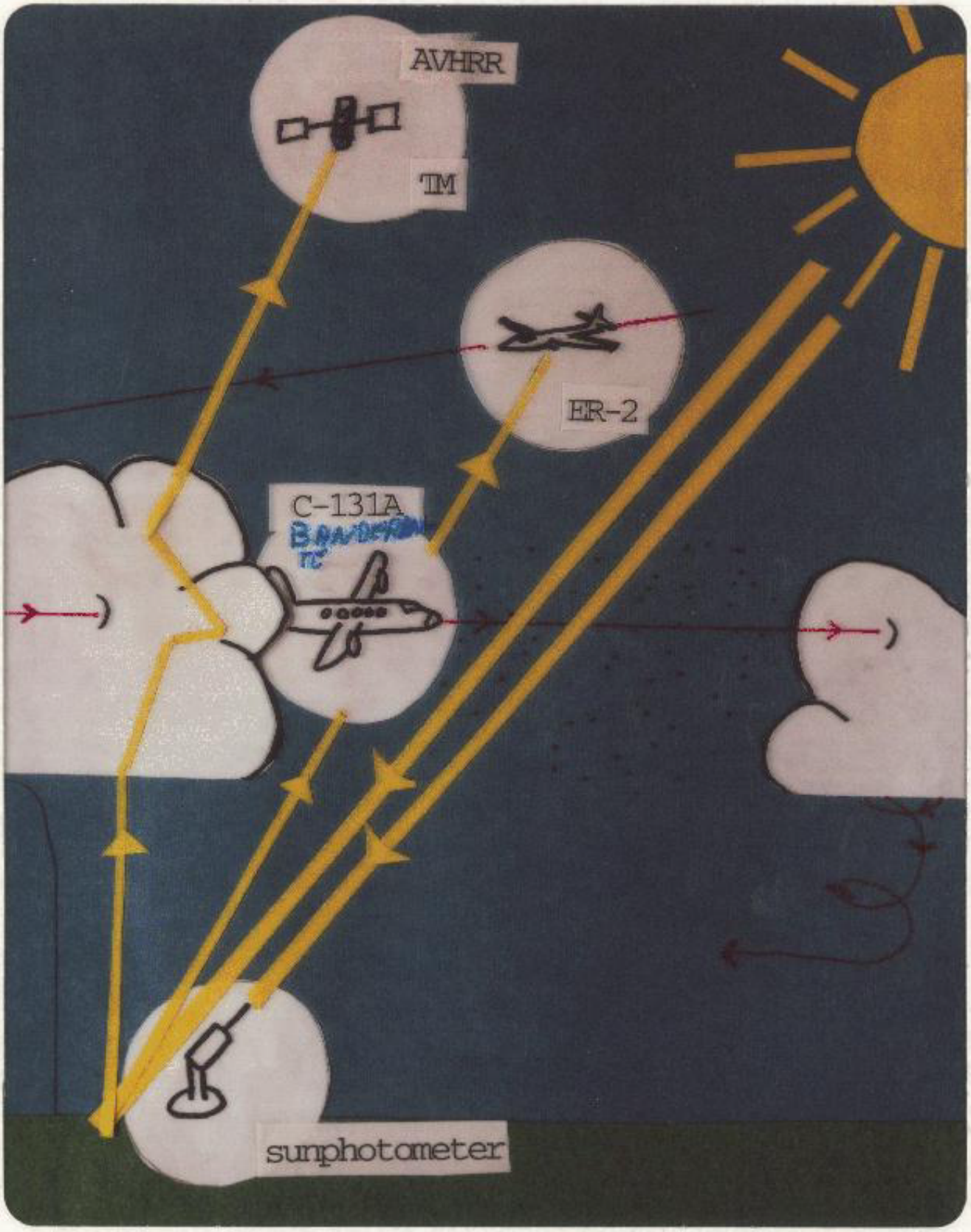
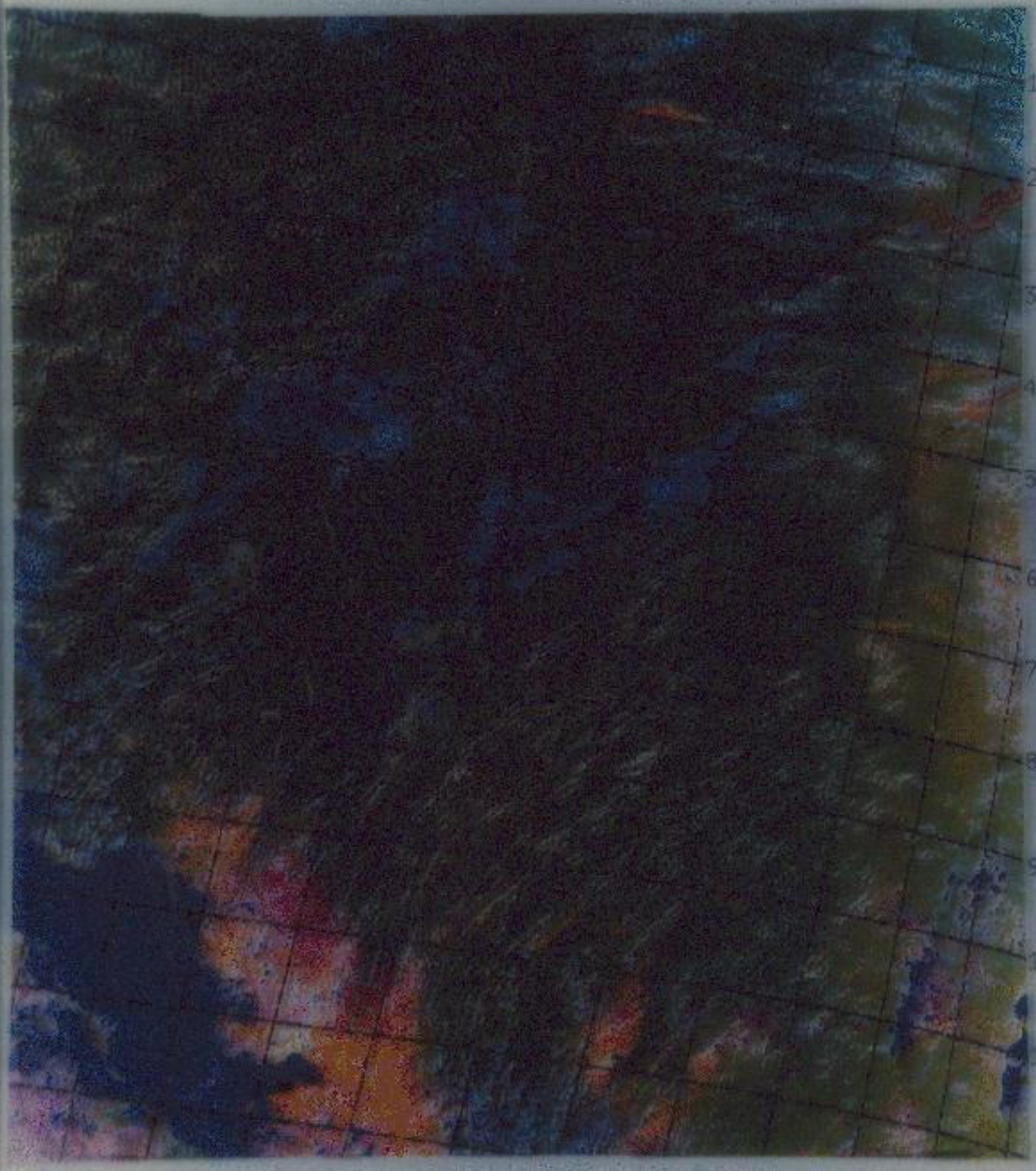
PRINS & MENZEL. '05




AVHRR
TM
ER-2
C-131A
sunphotometer

NOAA-AVHRR image of the Amazon Basin



RED FIRES, $T_b < 220K$ - BLUE, LARGE R_e - YELLOW, SMALL - WHITE