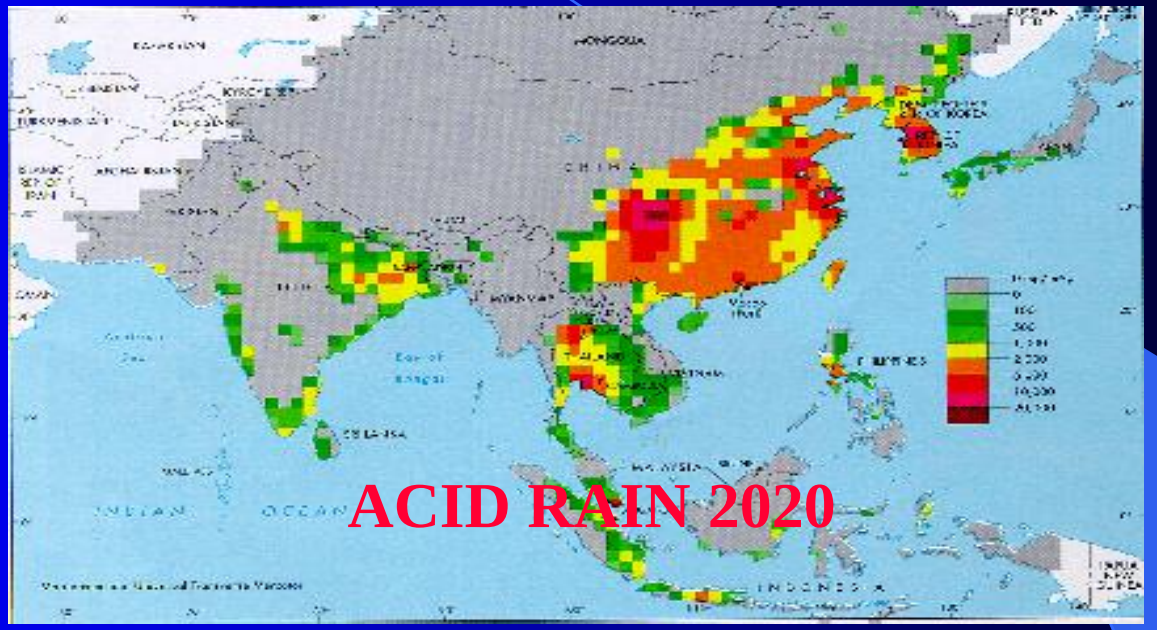
CORROSION MONITORING AT RRL BHUBANESWAR

AIT, BANGKOK
OCT.9-11, 2006



S.N.DAS

REGIONAL RESEARCH LABORATORY
BHUBANESWAR, INDIA

ABOUT THE LABORATORY

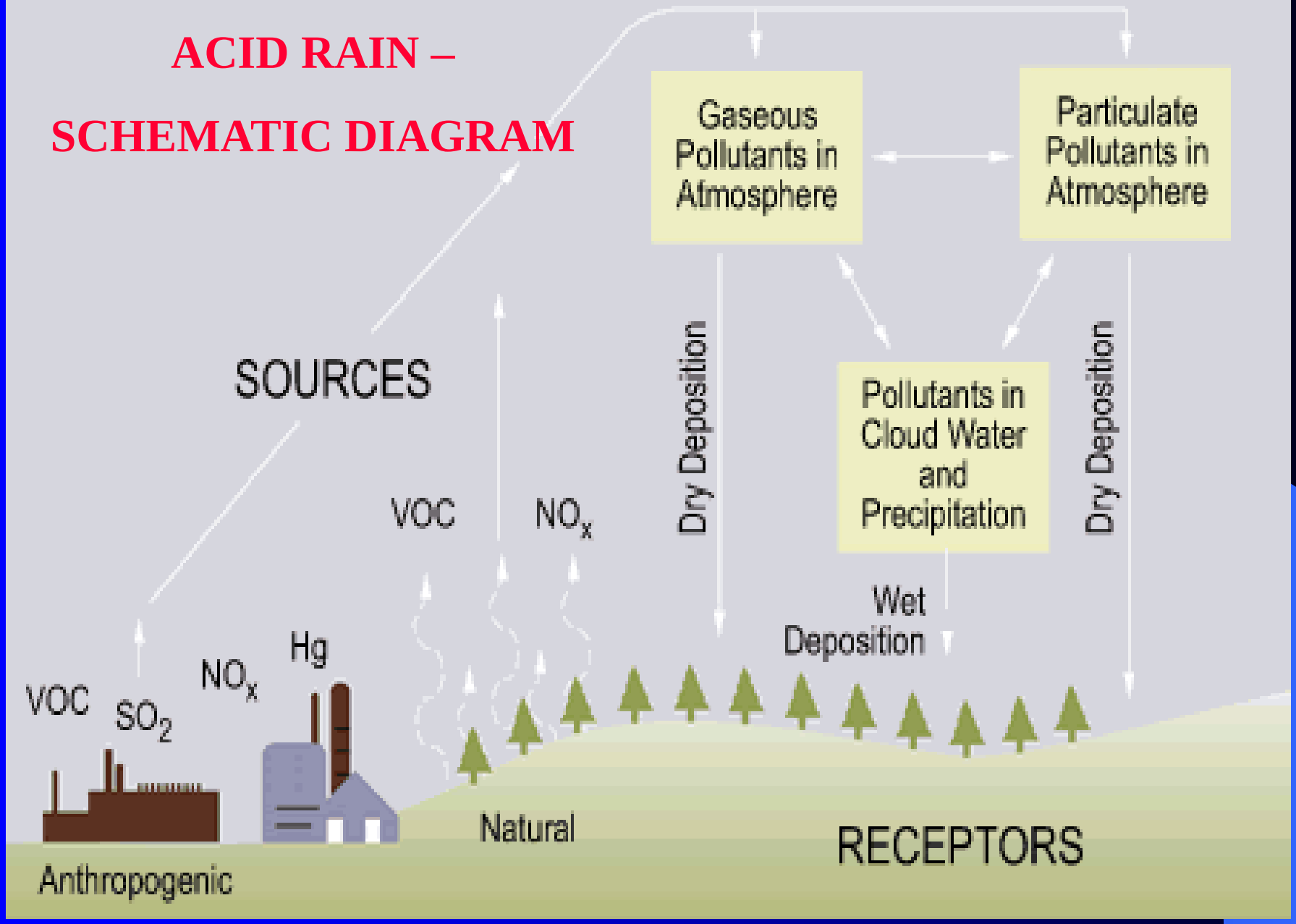
- A PART OF CSIT NET-WORK HAVING 40 DIFFERENT LABS SPREAD ALL OVER THE COUNTRY WITH >10,000 SENIOR SCIENTISTS AND 80,000 SCHOLARS AND YOUNG RESEARCHERS
- RRL – A MULTIDISCIPLINARY LAB WITH STRESS ON MINERAL PROCESSING & MATERIALS DEVELOPMENT/TESTING
- ENVIRONMENET & SUSTAINABILITY IS A SMALL GROUP WITH 6 Sc & 20 TEMPORARY YOUNG SCHOLARS
- 15 EXTERNALLY FUNDED PROJECTS, 03 FOREIGN COLLABORATIONS AND TWO IN-HOUSE PROJECTS
- ECF FROM INDUSTRIES & OTHER FUNDING BODIES
- EXCELLENT FACILITIES LIKE TEM, SEM, XRD/XRF/ ICPMS, GC, IC, AAS, NMR, GAS ANALYZERS…….

AIR POLLUTANTS & EFFECTS

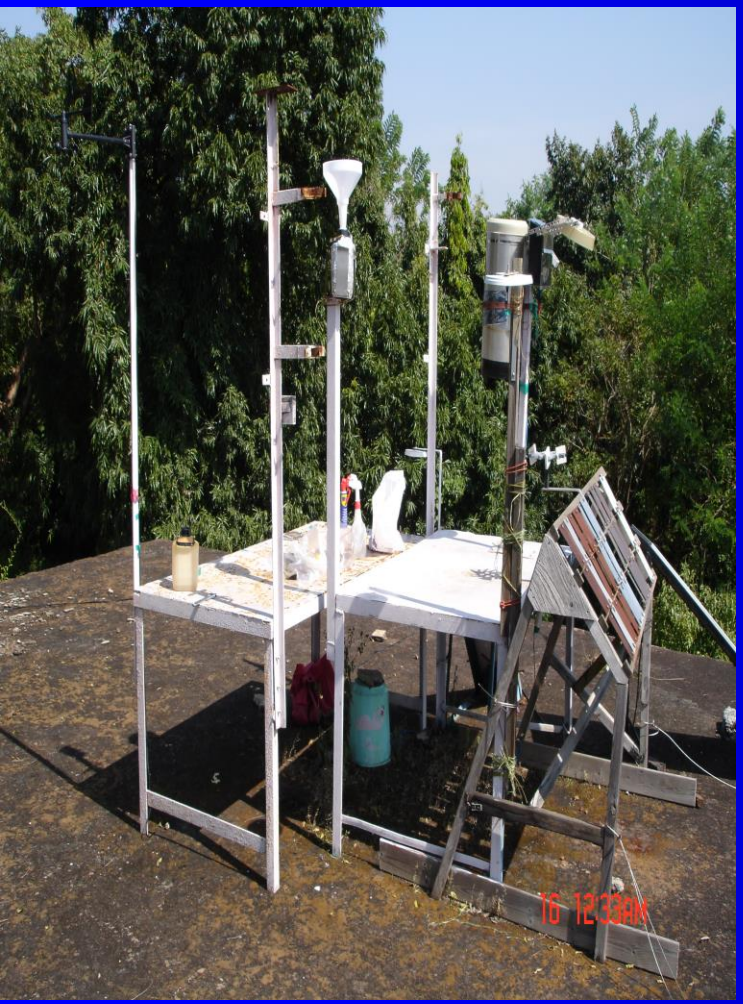
SPM & RSPM	AFFECTS AIR QUALITY, VISIBILITY & HUMAN HEALTH
ACIDIC EMISSIONS (AEROSOLS & GASES)	ACID PRECIPITATION – WET & DRY, NUTRIENT DEPLETION, CORROSION, AFFECTS AQUATIC & PLANT LIVES
GHGs (CH_4, N_2O, CO_2)	TEMP. RISE, SEA-LEVEL RISE, MELTING OF POLAR ICE & GLACIERS, EXTREME MET EVENTS (flood, cyclone, heat & cold waves…..)
OTHERS (EC, NOx, Cl_2, O_3, CFCs, NH_3, HNO_3)	SMOG, LONG-TERM CLIMATE CHANGES, OZONE HOLE, HEALTH EFFECTS

ACID RAIN –

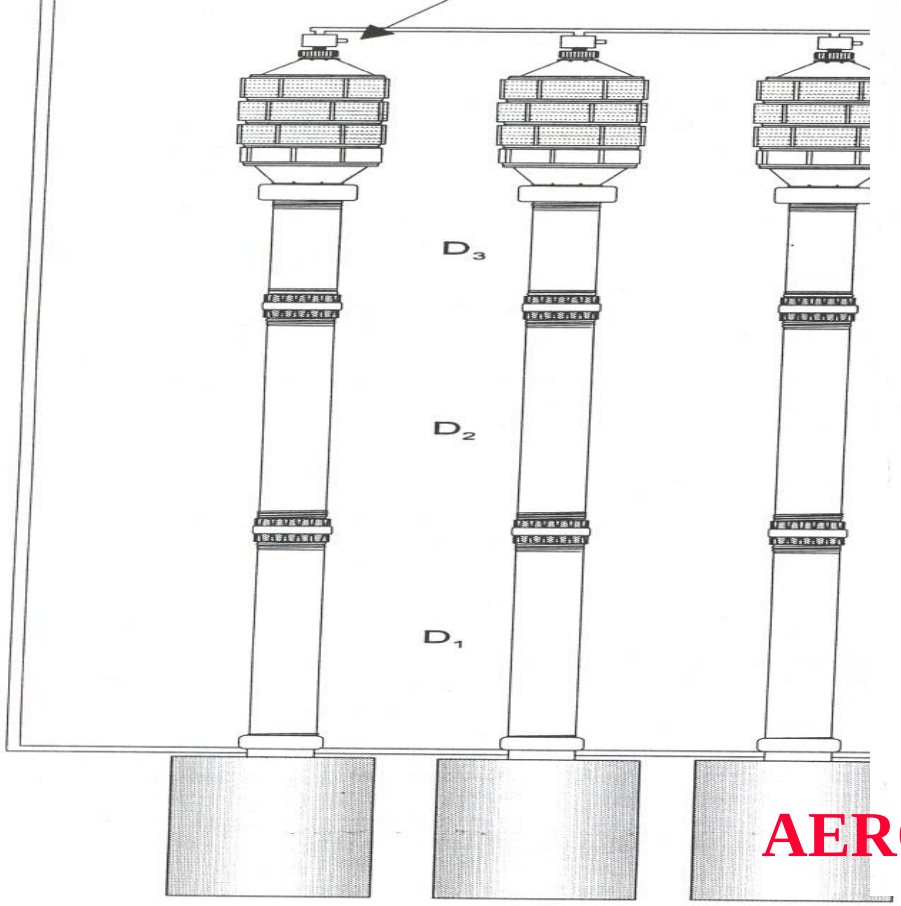
SCHEMATIC DIAGRAM

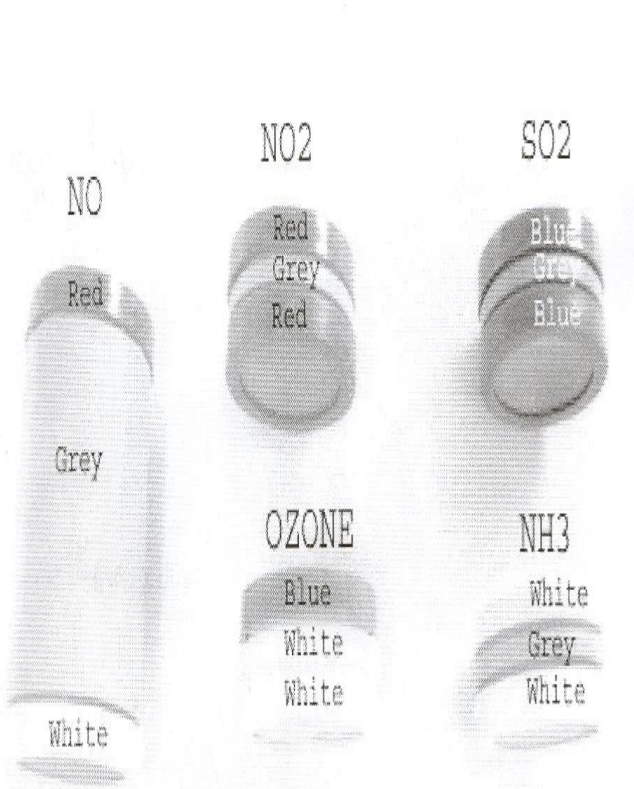


EXISTING FACILTIES AT THE RURAL BACKGROUND STATION



- AUTOMATIC WO & TWO BULK COLLECTORS
- ACTIVE AEROSOL COLLECTOR
- PASSIVE COLLECTORS
- SOLAR POWER BACKUP
- AUTOMATIC WEATHER MONITORING STATION





AEROSOL COLLECTORS

EXISTING FACILTIES – AEROSOLS & TRACE GASES

- PASSIVE COLLECTORS
- ACTIVE COLLECTOR WITH GAS PACK
- DENUDERS WITH GAS PACKS
- CLEAN AIR CHAMBER
- ION CHROMTOGRAPH

PROJECTS COMPLETED

GHGs – RICE FIELDS	**NATIONAL METHANE CAMPAIGN - IGBP** **ALGAS - ADB** **METHANE ASIA – WORLD BANK** **NATCOM-I: EMISSION ESTIMATES & UNCERTAINTY REDUCTION – GEF** **UPLANDS – ISRO GBP**
GHGs - WETLANDS	THREE REPRESENTATIVE WETLANDS – DST, SASCOM
ACID RAIN, AEROSOLS, CORROSION	SWEDISH COLLABORATION – I RAPIDC-II [SEI, MISU, IVL, SCI]

IMPORTANT FINDINGS - 1

- **ACIDITY OF WET/DRY DEPOSITS & AEROSOLS (PARTICULATE MATTER & GASES) INCREASING**
- **ACIDIFYING POLLUTANTS OF CONTINENTAL ORIGIN**
- **SIGNIFICANT SOIL EROSION, NUTRIENT DEPLETION & MATERIAL CORROSION**

AIR POLLUTION – DYNAMIC MODELING

- FIVE DAYS BACK TRAJECTORY FROM BHUBANESWAR OVER 150 MPA – DIGITAL DATA FROM NCMRWF, SCOTLAND
- CONVERSION INTO PHYSICAL DATA USING Mc.GRATH MODEL
- SUBDIVISION INTO CONTINENTAL, OCEANIC AND LOCAL (including BoB) ORIGINS USING MATCH MODEL
- DATA INTERPRETATION WITH RESPECT TO RAINWATER CHEMICAL CHARACTER

IMPORTANT FINDINGS - 2

- DUST PARTICLES TRANSPORTED FROM ARABIAN DESERTS, NOT RAJASTHAN
- ACID PRECURSORS FROM WEST COAST, NOT CENTRAL INDIA
- AMMONIA AS MAIN NEUTRALIZER RATHER THAN CRUSTAL PARTICLES
- AMMONIA SERVES AS SOIL ACIDIFIER UNDER NUTRIENT DEFICIENT CONDITIONS
- EXCESSIVE FINE & ELEMENTAL CARBON FROM TRANSPORT, FOREST FIRE & COOKING STOVES
- SIGNIFICANT CORROSION OF MATERIALS DUE TO ATMOSPHERIC ACIDITY

ONGOING AND UP-COMING PROJECTS

1. GREENHOUSE GASES

- **PRIMARY STANDARD DEVELOPMENT – CSIR, COORD. BY NPL**
- **GHGs FROM UPLANDS, PHASSE-II – ISRO GBP**
- **N_2O FROM TRADITIONAL & NON-TRADITIONAL PULSES – DST**
- **NATCOM, PHASE-II – CAPACITY BUILDING & UR**

ONGOING AND UP-COMING PROJECTS

2. ACID RAIN AND AEROSOLS

- **RAPIDC PAHSE-III – SEI (MISU, IVL), STOCKHOLM**
- **CORROSION – MRI, STOCKHOLM**
- **AIR POLLUTION MODELING – CSIR COORD. CMMACS**
- **ORISSA PARTICIPATION OF YOUTH IN REALTIME OBSERVATION (PROBE-ORISSA)-DST**
- **ACID RAIN & AEROSOLS IN AND AROUND BHUBANESWAR & VIZAG – DST**
- **ICARB – LAND & OCEAN – ISRO GBP**
- **INDOFLUX – INDO-AMERICAN SCIENCE FORUM & DST**

ONGOING AND UP-COMING PROJECTS

3. FUTURISTIC AREAS LIKELY TO BE SUPPORTED

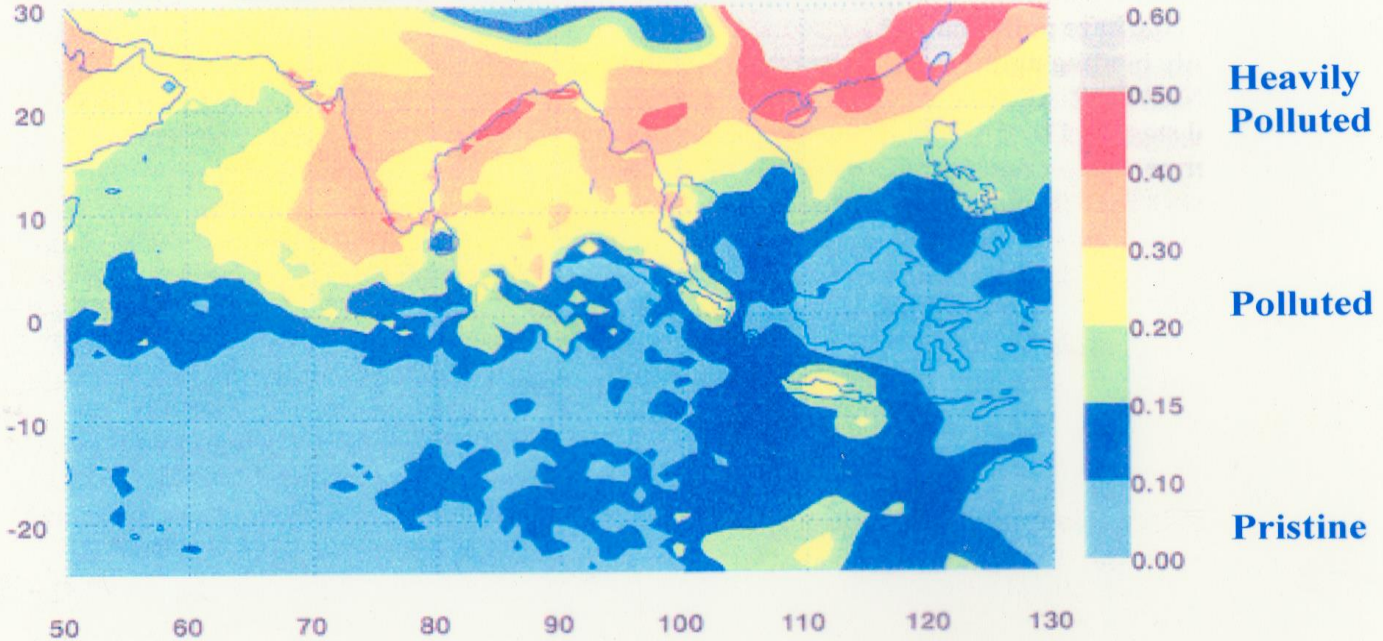
- **AIR TRAJECTORY MODELING (MATCH)**
- **VULNERABILITY & ADAPTATION TECHNOLOGY (NATCOM)**
- **AEROSOL- HORIZONTAL SIZE AND MASS DISTRIBUTION**
- **ATMOSPHERIC ELEMENTAL AND FINE CARBON**
- **SIZE, NUMBER, MASS DISTRIBUTION & CHEMICAL CHARACTER OF COASTAL / INLAND AEROSOLS**
- **BIO-MASS BURNING/SLASH & BURN AGRICULTURE – EFFECTS ON AIR QUALITY (NATCOM-II)**
- **GHG & OTHER EMISSIONS FROM TRANSPORT SECTOR**
- **STACK EMISSIONS – AEROSOLS & TRACE GASES**

OTHER PROJECTS OF INTEREST HERE

- MATERIALS FAILURE TESTING – RAIL WHEELS (DYE PENETRATION..)
- ENV. IMPACT ASSESSMENT AND ENV. MANAGEMENT PLAN FOR INDUSTRIES, PORTS, MINES….
- NEW MATERIAL DEVELOPMENT LIKE COMPOSITES, NANO-MAT. THROUGH PFHS, PLASMA…

The Great Asian Haze

INDOEX Data for Jan-Mar 1999

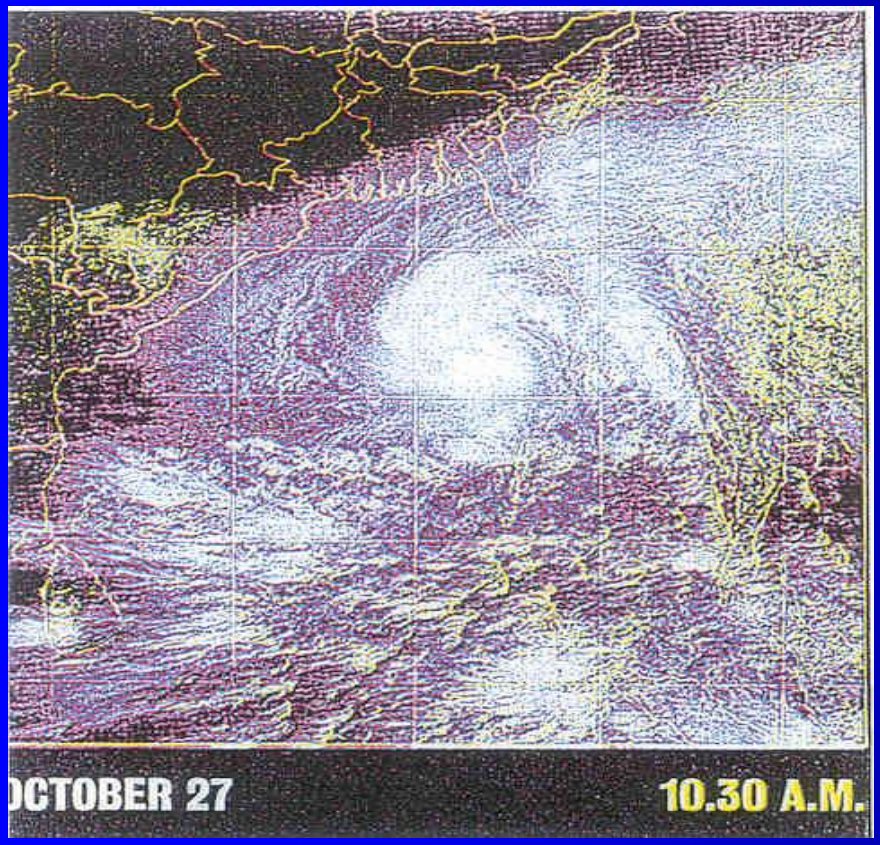


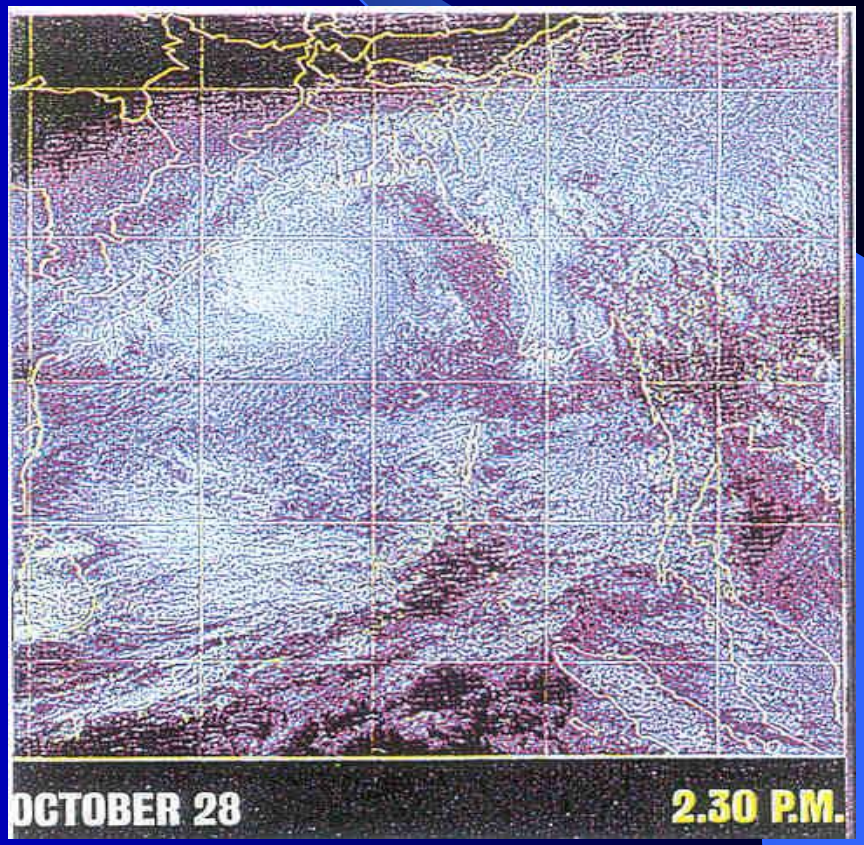
The regional map of aerosol column amount. The values over ocean are retrieved from satellite data (Ramanathan et al., 2000) and over land are estimated using a 3-dimensional model (Collins et al., 2000)

ABC- ICARB – ISRO GBP

EXTREME MET. EVENTS IN ORISSA, INDIA

HEATWAVES, FLOODS & CYCLONES






THANKYOU
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