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Development of emission inventories to support ARCTAS

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ARCTAS Science Team Meeting

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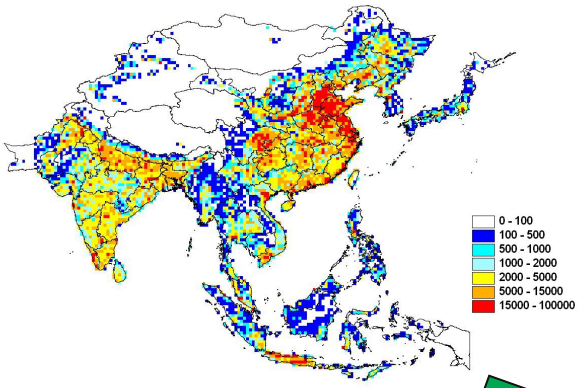
ARCTAS emission inventories

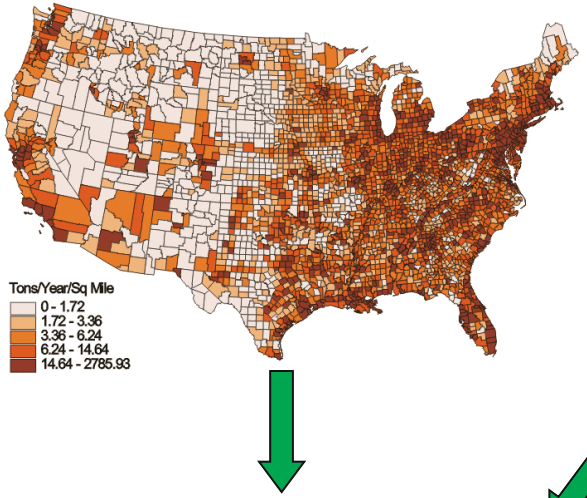
- Species: SO_2, NO_x, NMVOC, CO, CO_2, CH_4, NH_3, PM_{10}, $PM_{2.5}$, BC, OC, Hg
- Spatial resolution: $1° \times 1°$ or better (Asia is $0.5° \times 0.5°$) for Northern Hemisphere
- Vintage: 2005-2006; 2000 as a fallback in areas where change is minimal
- Anthropogenic sources only; monthly or seasonal profiles where possible
- Default inventories will be founded on the latest global EDGAR/GEIA data, as used in HTAP, etc., replaced in important areas with improved and updated data
- Asia based on 2006 INTEX data at: http://www.cgrer.uiowa.edu/EMISSION_DATA_new/index_16.html
- All gridded inventories will be posted to the University of Iowa ACESS website; pre-mission data sets will be available in early March

Components of ARCTAS emission inventory

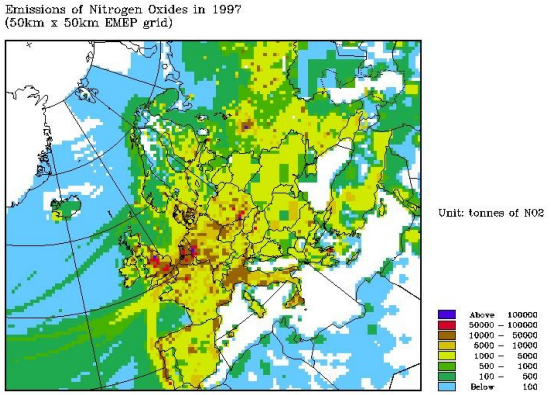
INTEX-B Asia 2006

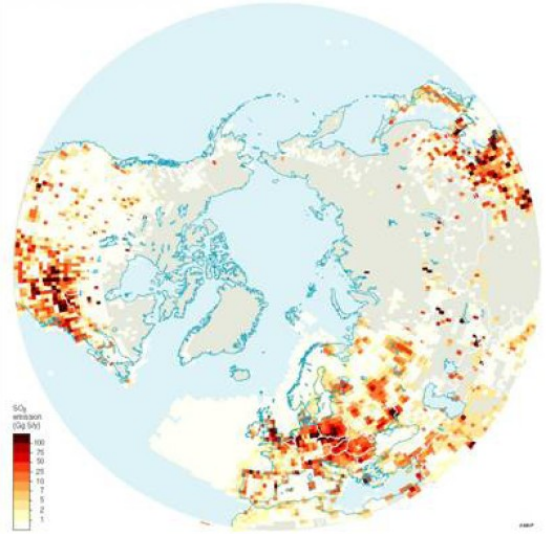


US NEI



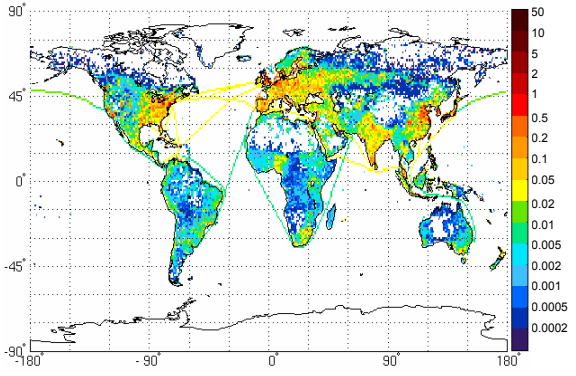
EMEP



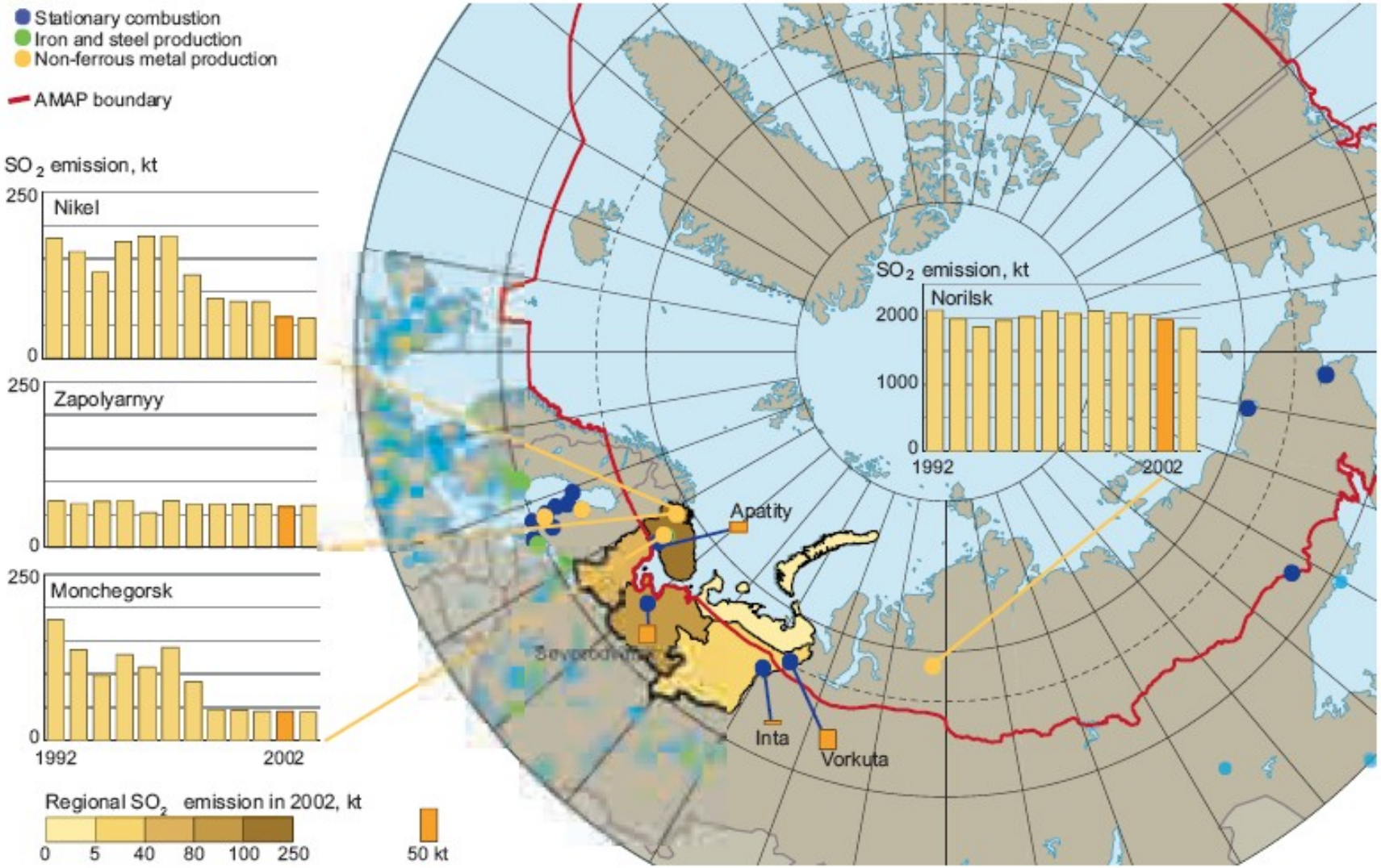


Detailed and updated data for Canada, Mexico, and Russia

EDGAR, GEIA (global defaults)

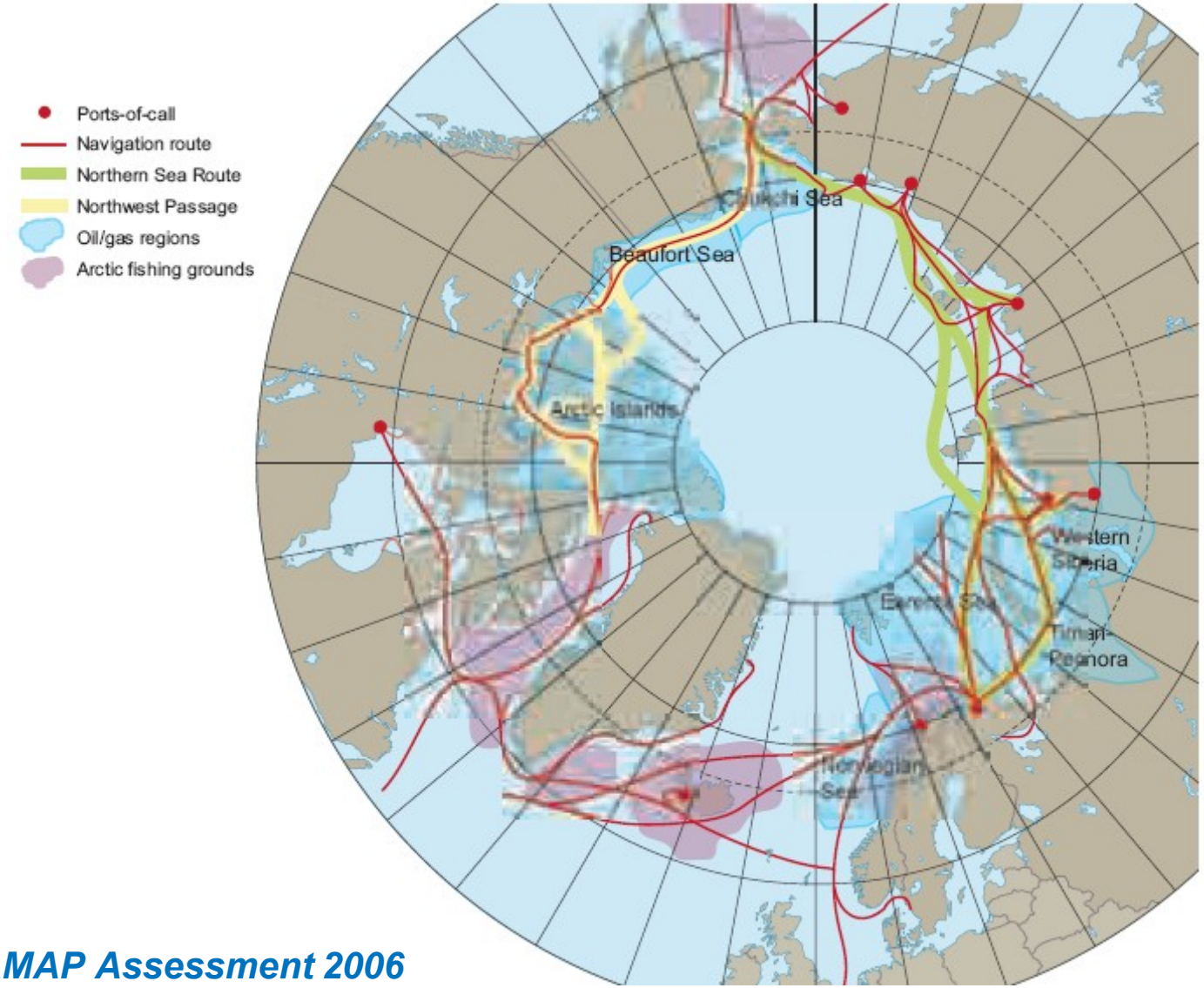


Major Russian point sources near the Arctic are a challenge



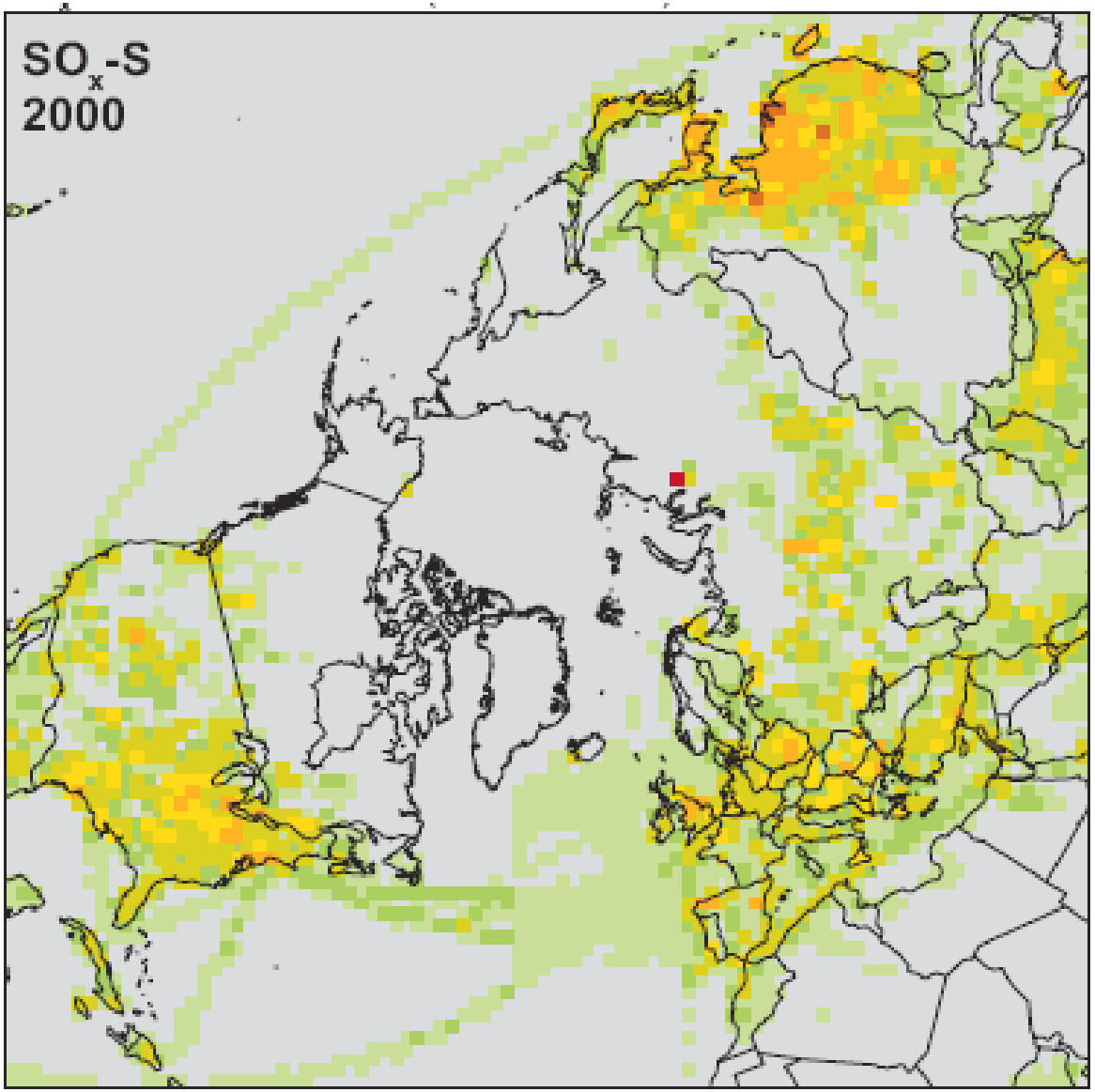
Source: AMAP Assessment 2006

Arctic shipping: major navigation routes and ports of call



Source: AMAP Assessment 2006

Gridded SO_2 inventory for 2000 used in AMAP Assessment 2006



This is EDGAR-based, 1°x 1°resolution, updated by IIASA and the JRC/Italy.

We hope to collaborate with IIASA to obtain a 2005 Russian emissions data set, projected from 2000 data and checked against 2005 IEA data for major sectors.

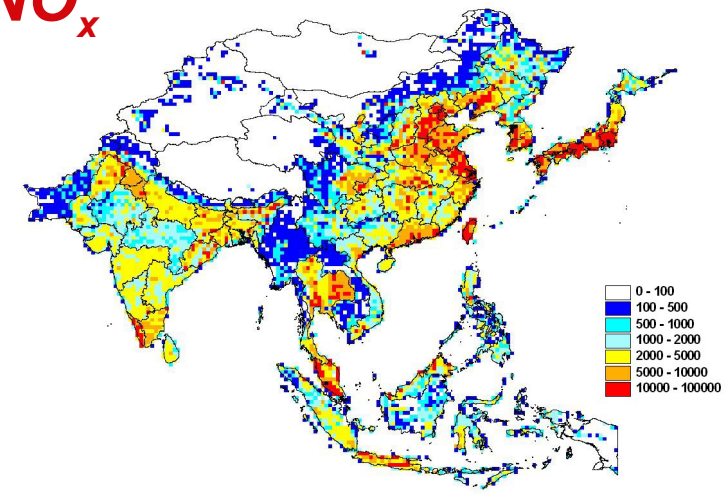
Year-2000 data are no longer adequate: Growth in emissions in China, 2001-2006 (%)

Change, 2001–2006 (%), in:	Power	Industry	Residential	Transport	Others	Biomass burn	Total
SO_2	29	40	4	34	-8	0	**28**
NO_x	77	47	11	13	0	-2	**48**
VOC	85	49	13	31	0	0	**28**
CO	67	21	10	20	2	0	**16**
PM_{10}	24	10	13	37	0	-2	**11**
$PM_{2.5}$	23	16	12	41	0	-2	**14**

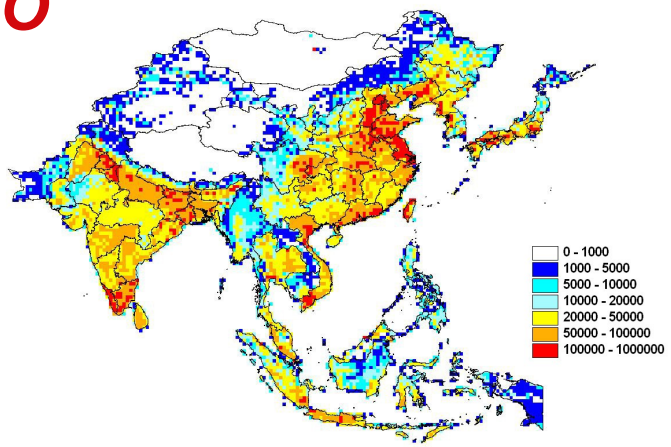
Growth has been particularly large for SO_2 and NO_x in the power and industrial sectors where release height is greater, and therefore emissions are more conducive to long-range transport. We are working now on updated SO_2 and NO_x trends in Asia through 2007 with Richter/Burrows satellite group.

We will use the INTEX Asian inventory for 2006

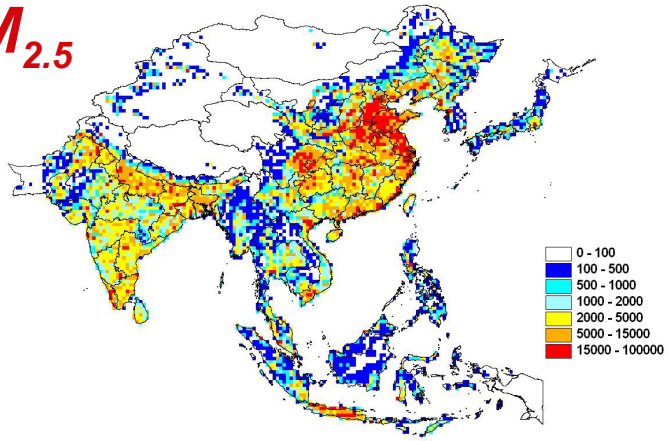
NO_x



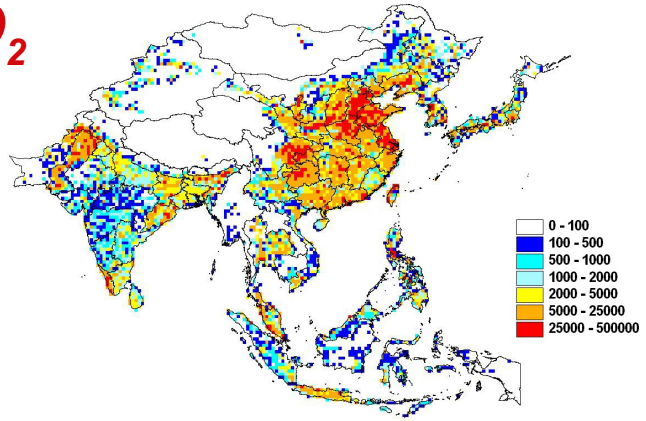
CO



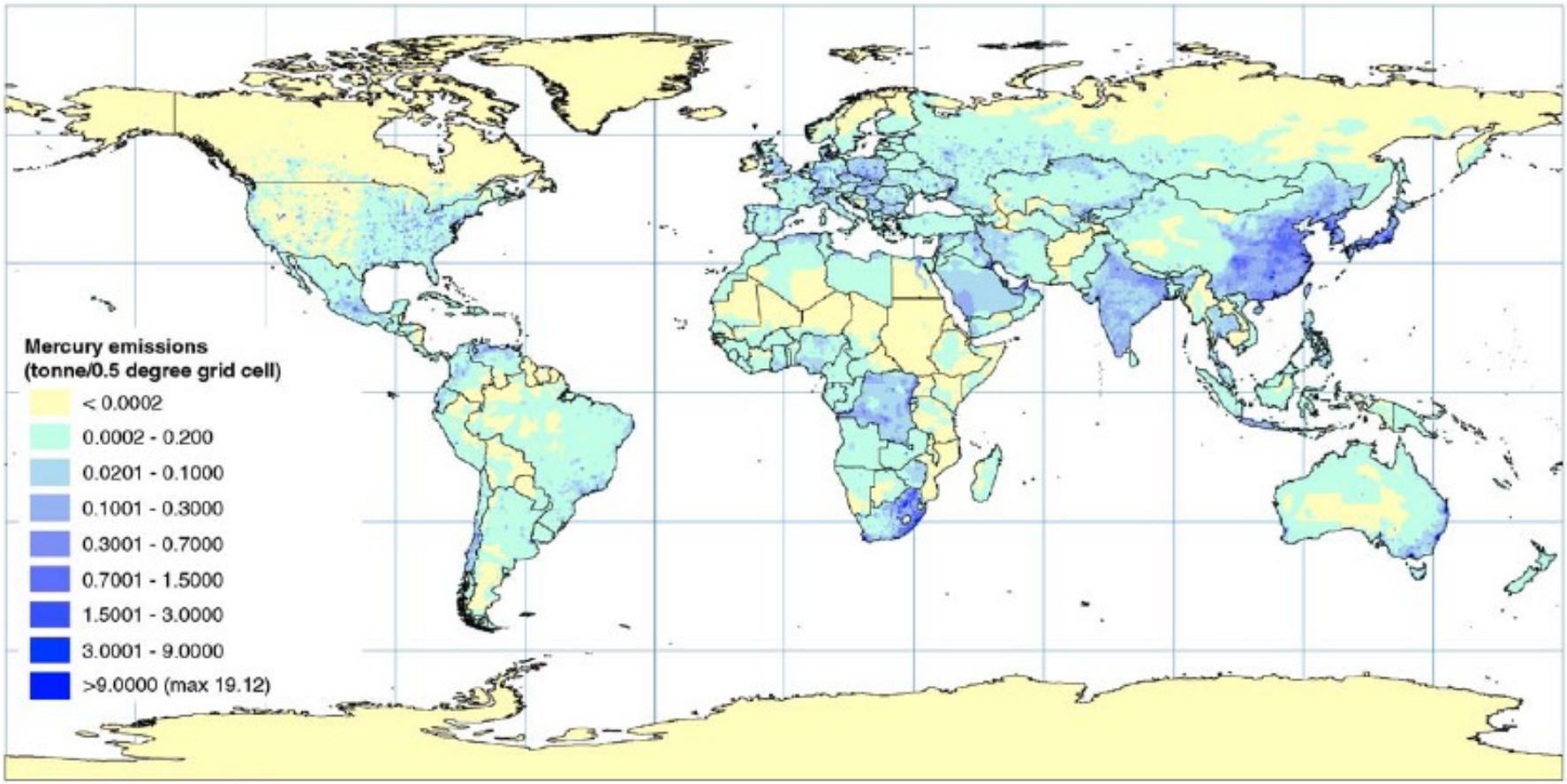
$PM_{2.5}$



SO_2



Global mercury emissions, year 2000, 0.5° × 0.5° resolution (Wilson et al., Atmos. Environ., 2006) will be used, updated to 2005/6 where possible, especially for China



Issue and Questions

- Deadlines for needed emission data pre-mission. Early March OK?
- Any special requests for other species? What NMVOC speciation mechanisms?
- Is special point-source data important or is regional gridding adequate?
- Resolutions: Spatial 1° × 1° or better; Temporal monthly: OK?
- Natural sources and open biomass burning taken care of?
- Other issues?