Developing GIS Applications to Manage and Disseminate Emissions Activity Data

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Overview

- Introduction
- Data collection
- Development of GIS application
- Summary

Introduction (1 of 3)

- The California Regional $PM_{10}/PM_{2.5}$ Air Quality Study (CRPAQS)
  - Multi-year program involved meteorological and air quality monitoring, emission inventory development, data analysis, and air quality simulation modeling.

CRPAQS Domain

Introduction (2 of 3)

- Emission inventory development phase included collection of emissions activity data during 1999-2001 period to improve the California Air Resources Board's (CARB) emissions activity databases.

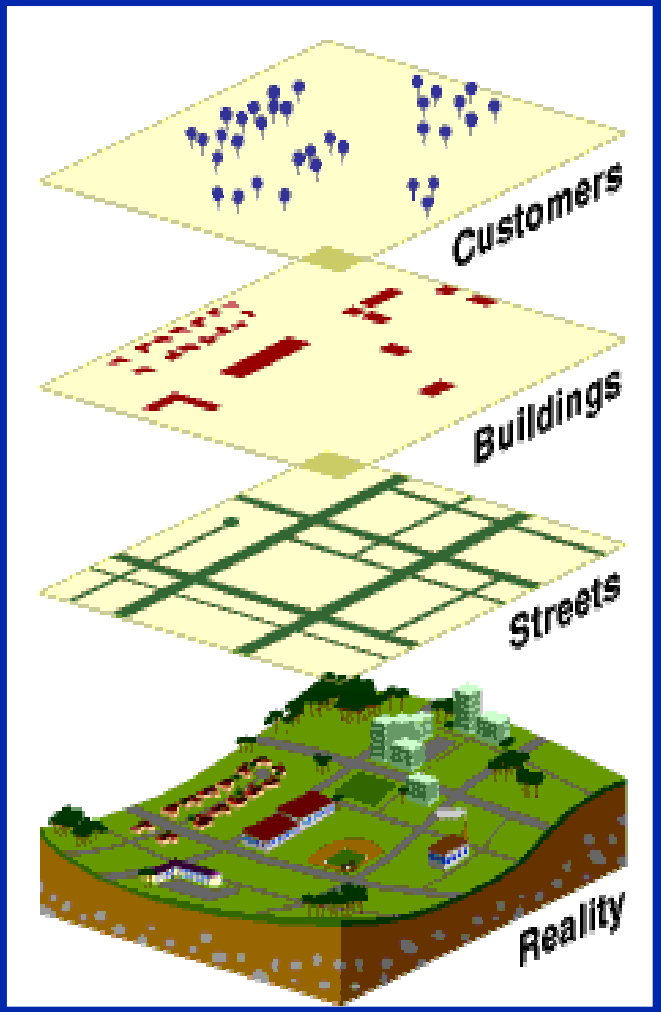
- Emissions activity data includes geographic information.

Introduction (3 of 3)

- Data must be available to analysts for the data analysis phase of CRPAQS beginning in the fall of 2002.
- An Internet-based GIS application was developed to manage, display, and disseminate data via the web.
- CRPAQS On-line Atlas with Regional and Site-specific Events (COARSE)

What is GIS?

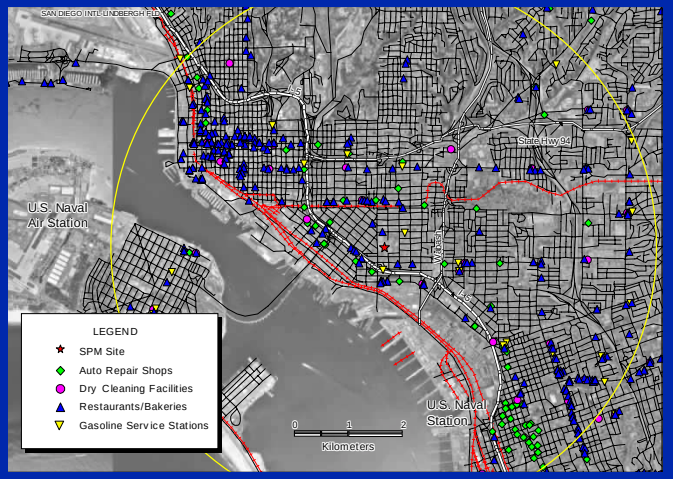
- GIS software tools map and analyze things that exist and events that happen on earth.
- GIS integrates database operations with the geographic analysis benefits offered by maps.
- Internet-based GIS applications provide a way to display and disseminate data to a broad audience.



ESRI, 2000

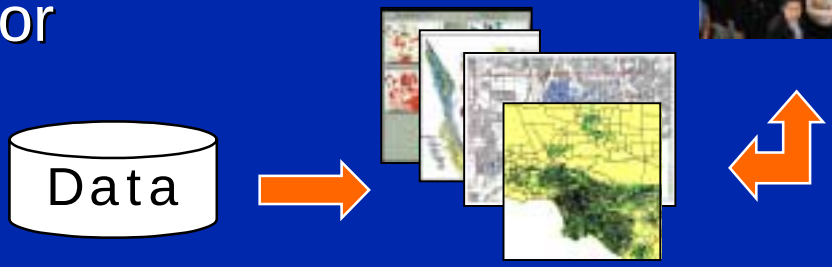
Why Use GIS?

- GIS adds spatial context to data.



- Software is becoming more affordable and easier to use.

- GIS provides a framework for managing, displaying, and disseminating data.



Data Collection Objectives

- Data collection phase entailed gathering and processing

(1) short-duration emission events data that may impact CRPAQS air quality measurements; and

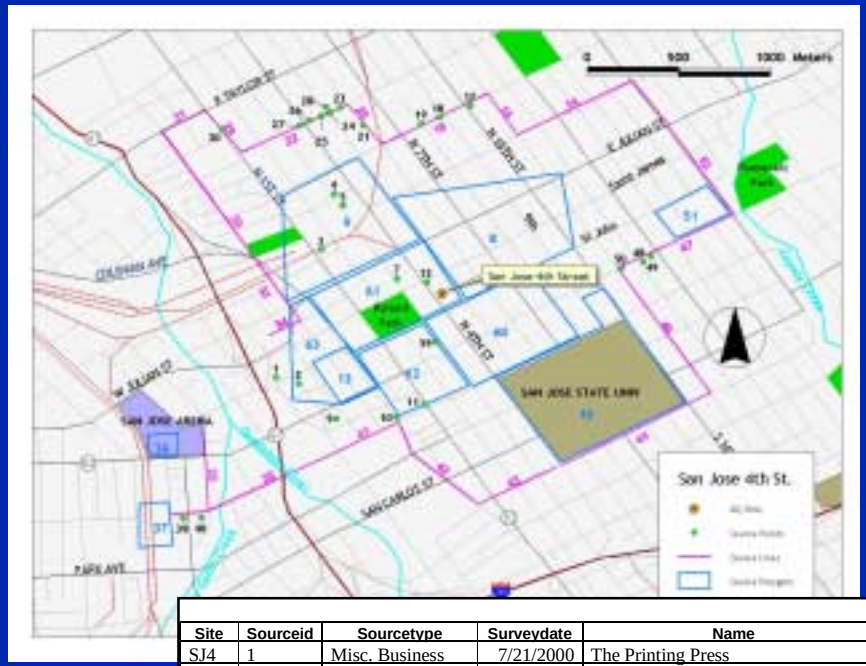
(2) highly resolved activity data in the immediate surroundings of 24 selected CRPAQS monitoring sites.

Data Sources

- Data sources:
  - observers stationed in the field
  - automated digital camera equipment
  - publicly available records and/or news reports

Data Products

Atlas/database containing ground-truth maps, tabular data, and observation diaries



Site	Sourceid	Sourcetype	Surveydate	Name
SJ4	1	Misc. Business	7/21/2000	The Printing Press
SJ4	2	Construction	7/21/2000	Opus West Construction Company
SJ4	3	Misc. Business	7/21/2000	Flow Master
SJ4	4	Misc. Business	7/21/2000	Plywood and Lumber Sales
SJ4	5	Misc. Business	7/21/2000	General Auto
SJ4	6	Residential Zone	7/21/2000	none
SJ4	7	Food Preparation	7/21/2000	Marisco's India
SJ4	8	Residential Zone	7/21/2000	none
SJ4	9	Vehicle	7/21/2000	Greyhound bus terminal
SJ4	10	Food Preparation	7/21/2000	Museum Cafe
SJ4	11	Food Preparation	7/21/2000	Gordon Biersch Brewery

Archive of digital photographs

Bakersfield
December 19, 2000
12:30 to 1:15

Roofers observed:
- 6004 Friant Ct. (house)
- 402 Lansing Dr. (apartment)

Bakersfield
December 27, 2000
2:45 to 3:15

Roofers observed:
- 6004 Friant Ct.

Schools on Christmas Break (break started Dec15):
- Kleinpell Ave. and Winston
- Marella Way

Bakersfield
January 2, 2001
2:00 to 2:30

School back in session (break ends Jan 2):
- Marella Way
- Kleinpell Ave and Winston

City Park construction Observed (construction of new playground):
- Montclair St. and Marella Way.

Krispy Cream Doughnuts laid off approx. 35 workers on Dec. 26
- Stockdale and California

Bakersfield
January 9, 2001
1:35 to 2:05

City park construction observed:
- Montclair St. and Marella Way.

Soccer field containing large amounts of water:
- Montclair St. and Marella Way.

Bakersfield
January 16, 2001
12:10 to 12:45

City Park construction observed (nearly complete):
- Montclair St. and Marella Way.

Water on the soccer field is receding:
- Montclair St. and Marella Way.

Small road construction crew observed:
- Bermuda St. and Cherry Hills Dr.

Filling less than 10 potholes

Database containing news stories of emissions events

Application Development (1 of 2)

- ArcIMS - Environmental Systems Research Institute (ESRI) Internet mapping software
- Framework for implementing GIS services via the Internet
- Customizable and scaleable at all levels
  - User interface
  - Application features and functions
  - Server

Application Development (2 of 2)

Application Architecture

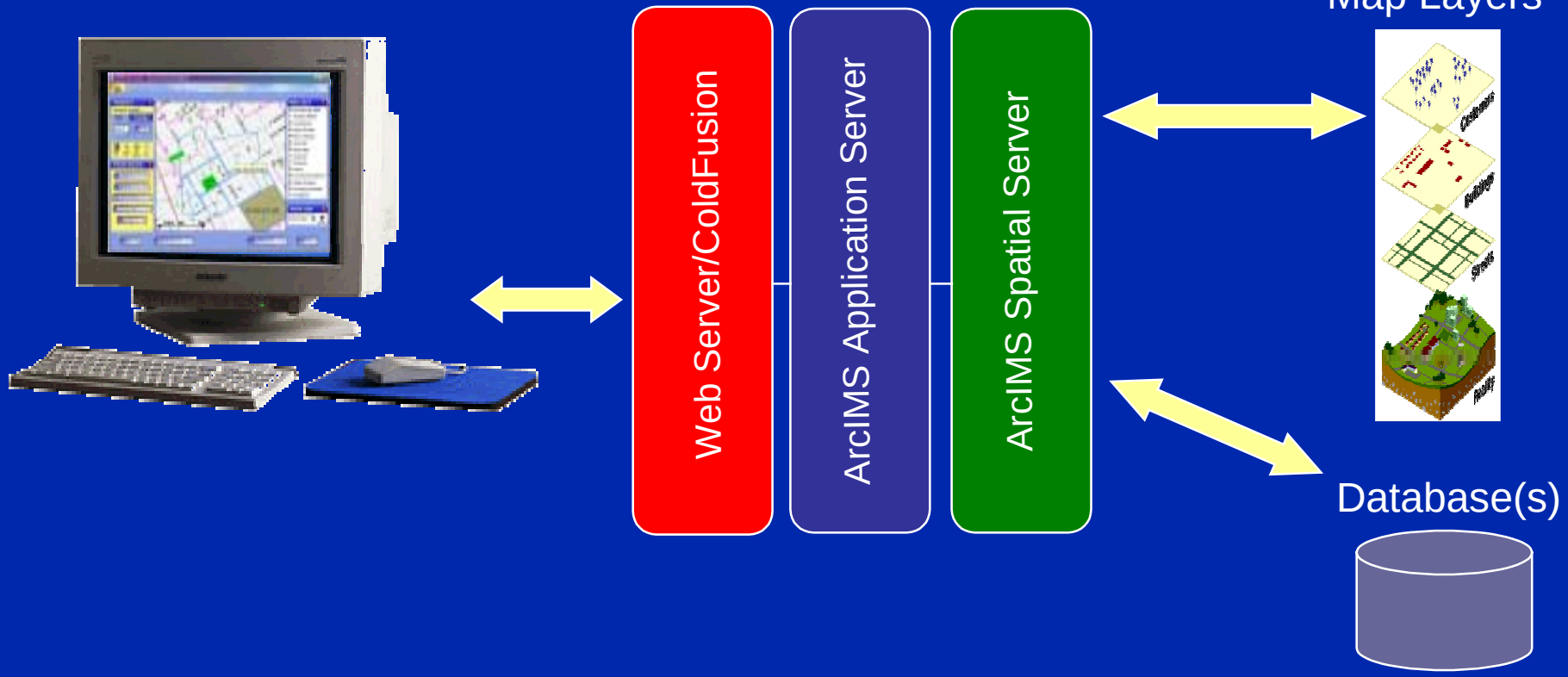
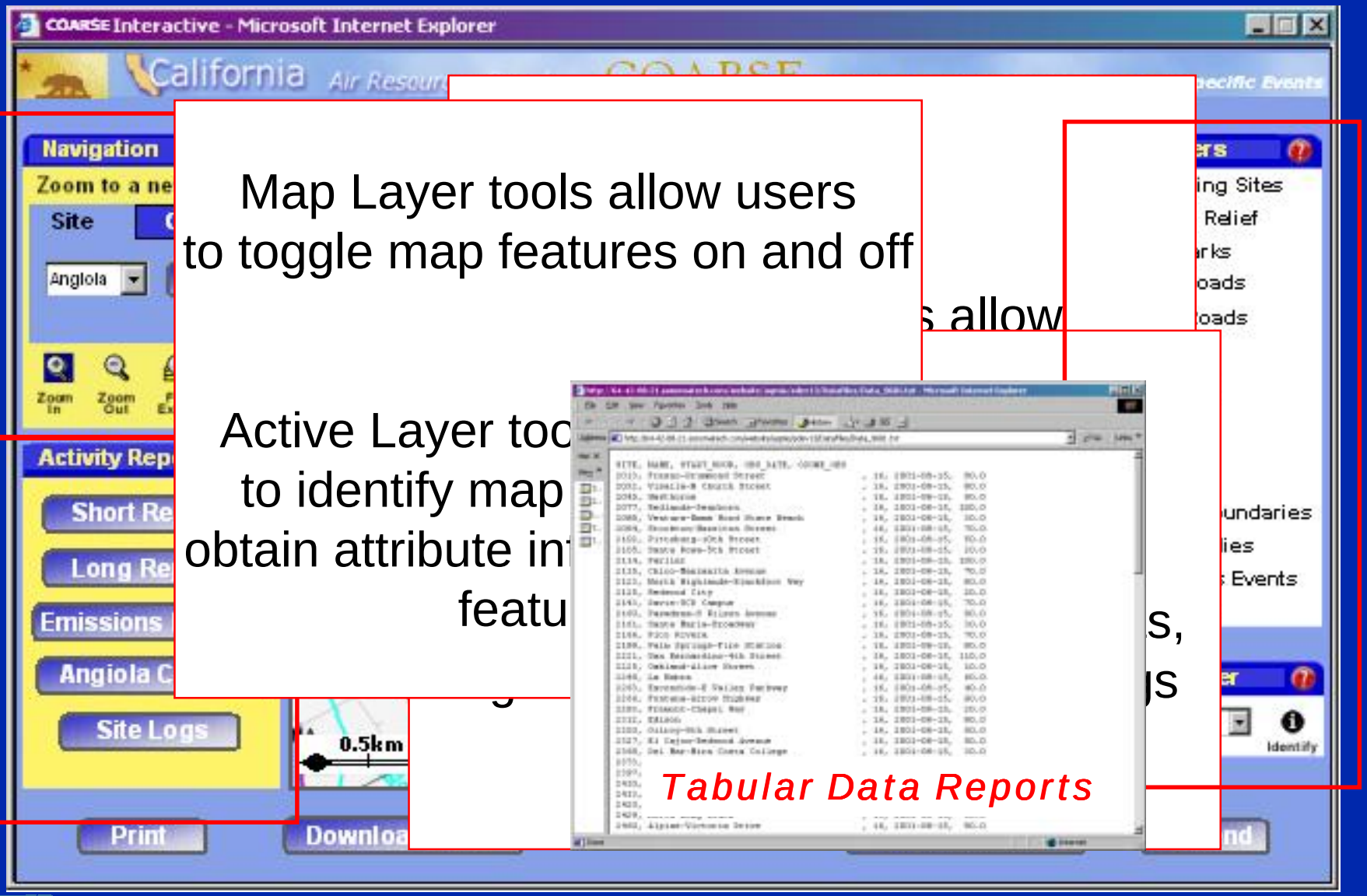


Figure adapted from ESRI, 2000.

COARSE Interface



Summary

- GIS applications are cost-effective and useful for managing, displaying, analyzing, and sharing environmental data with broad audiences.
- ArcIMS-based applications are highly scaleable, customizable, and can incorporate many types of data from different sources (databases).

Acknowledgements

- California Air Resources Board
  - Karen Magliano
  - Richard Bradley
  - Beth Schwehr
  - Robert Effa

- COARSE available in fall 2002:
  - http://www.sonomatech.com/coarse