Twenty-five years of Harmonisation conferences – looking back and ahead

Helge Rørdam Olesen

AARHUS
UNIVERSITY
DEPARTMENT OF ENVIRONMENTAL
SCIENCE

A focal point throughout the series of Harmonisation conferences:

- In the modelling community we should build upon the experiences of each other.
- An issue of permanent attention during the conferences:
  How can we establish mechanisms which work, when it comes to pooling experiences and obtain a better utilization of the work we do?

Constructing a pile of scientific knowledge

What to expect in my talk

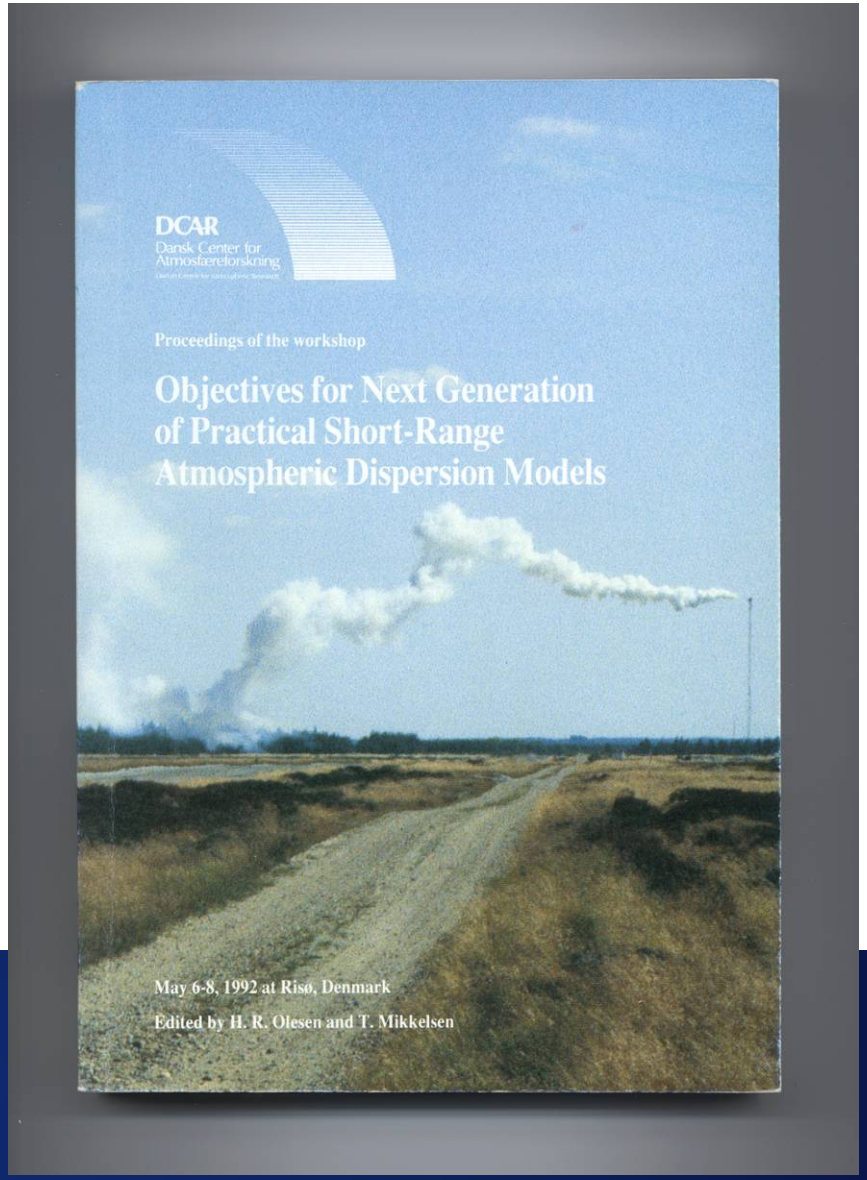
- I'll take you 25 years back in time…
- The fate of classic data sets
- A collection of successful activities – very briefly
- Some important lessons learnt – a glimpse into the work on model evaluation by the COST 732 action.
- Help requested: Concerns the Atmospheric Dispersion Wiki. How can we fulfil the intentions behind it?

Let’s go twenty-five years back in time

- An era before the World Wide Web

International workshop at Risø, Denmark, May 1992

The workshop was the start of the series of conferences on *Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes*



Electronic Information Exchange in the Field of Atmospheric Dispersion Modelling

H.R. Olesen

National Environmental Research Institute (N
e-mail: luhro@dmu1.dmu.min.dk
P.O. Box 358
DK-4000 Roskilde
Denmark

1. INTRODUCTION

This paper is meant as a short introduction to a poten
the atmospheric dispersion modelling community: ele
exchange.

It is the intention to point to some possibilities which
which could relatively easily be brought into existenc
stimulate discussions on which initiatives it will be ap

First, an example serves to illustrate some possibilitie
Then, a number of "media" for electronic information exchange are pres-
ented. Finally, some topics for discussion are suggested.

2. EXAMPLE OF ELECTRONIC INFORMATION EXCHANGE - THE US "TECHNOLOGY TRANSFER NETWORK"

The Office of Air Quality Planning and Standards in the US EPA runs a public Bulletin Board Service (BBS), called the "Technology Transfer Network" (EPA, 1991). It started in 1989, and has since then matured. Users from anywhere can log on to the TTN using an ordinary telephone and a modem (telephone 919-541-5742; baud rate 2400/1200/300, 8 data bits, no parity, 1 stop bit). They then get access to 8 different bulletin boards, each

This paper is meant as a short introduction to a **potentially useful tool for the atmospheric dispersion modelling community: Electronic information exchange**.

It is the intention to point to some possibilities which exist at present, or which could relatively easily be brought into existence. The idea is to stimulate discussions on which initiatives it will be appropriate to take.

Among the preparations for the workshop

- A request to John Irwin of the US EPA in June 1991.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ATMOSPHERIC RESEARCH AND EXPOSURE ASSESSMENT LABORATORY
RESEARCH TRIANGLE PARK
NORTH CAROLINA 27711

July 8, 1991

Helge Rordam Olesen
National Environmental Research Institute
Frederiksborgvej 399
DK-4000 Roskilde
DENMARK

Thank you for your letter of June 6, 1991 requesting information on our data archive, our electronic bulletin board system (BBS) and the UNAMAP evaluation.

1. Data Archive. This project (which was intended to be an ongoing effort) resulted in the construction of several ASCII data sets that are currently made available via our electronic BBS. Rather than list the data sets, I have enclosed a package of documentation that describes the data and the structure of the data sets. As you can see the initial project results are the only results to date. This is a continuing sad comment on the ability of our science to archive classic data sets for other users. Perhaps someday we can increase the data listings, or better yet, contribute our holdings to a group willing to archive data from many sources and make them easily available to researchers.

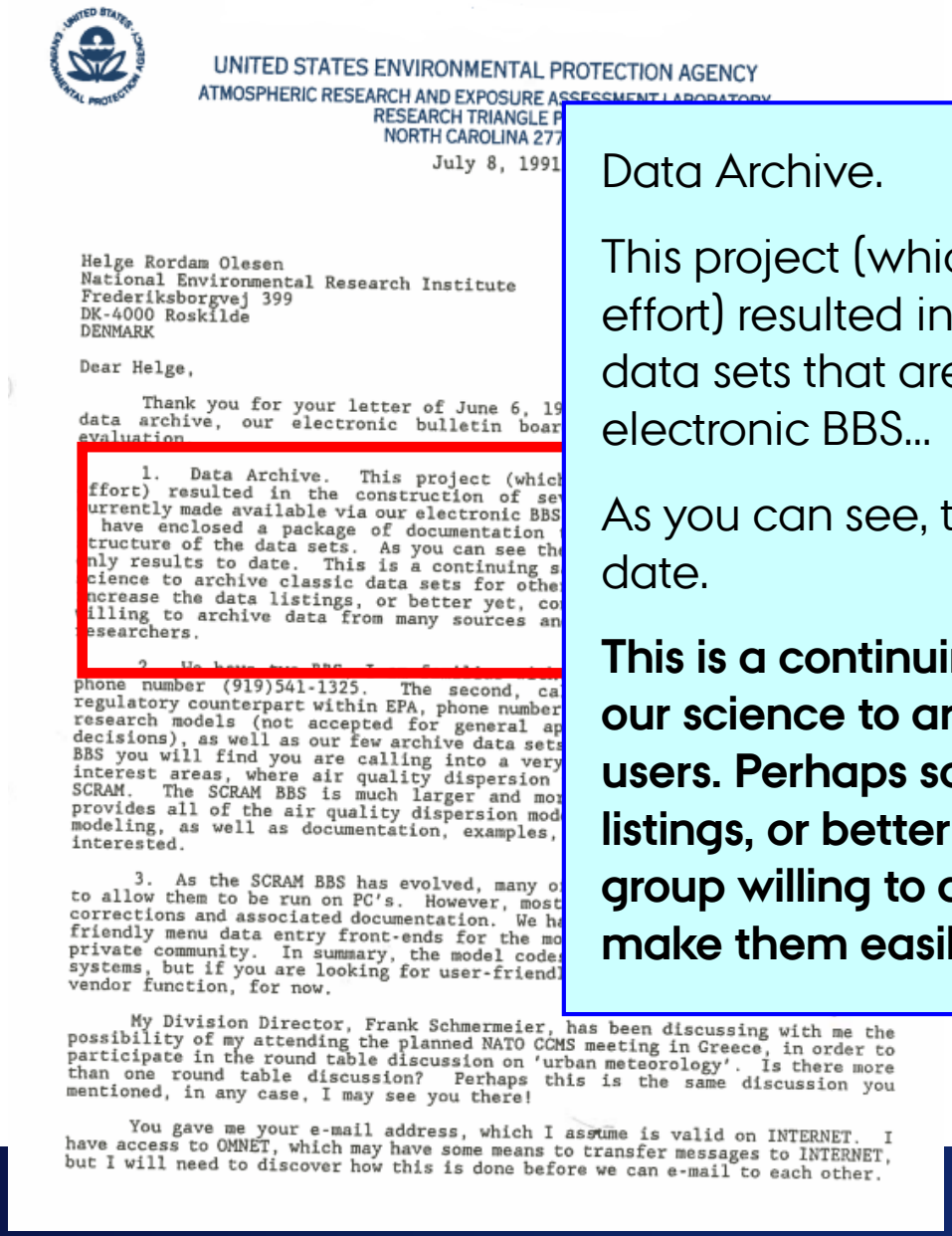
2. We have two BBS, I am familiar with. One is operated by my branch, phone number (919)541-1325. The second, called SCRAM, is operated by our regulatory counterpart within EPA, phone number (919)541-5742. Our BBS contains research models (not accepted for general applications involving regulatory decisions), as well as our few archive data sets. When you call in for the SCRAM BBS you will find you are calling into a very large BBS with several special interest areas, where air quality dispersion modeling is the subgroup called SCRAM. The SCRAM BBS is much larger and more sophisticated than ours. It provides all of the air quality dispersion models currently used in regulatory modeling, as well as documentation, examples, and other useful tips to those interested.

3. As the SCRAM BBS has evolved, many of the models have been rewritten to allow them to be run on PC's. However, most of the concern has been on code corrections and associated documentation. We have not attempted to create user-friendly menu data entry front-ends for the models. This task is left to the private community. In summary, the model codes can be downloaded from the BBS systems, but if you are looking for user-friendly models, this is only a private vendor function, for now.

My Division Director, Frank Schmermeier, has been discussing with me the possibility of my attending the planned NATO CCMS meeting in Greece, in order to participate in the round table discussion on 'urban meteorology'. Is there more than one round table discussion? Perhaps this is the same discussion you mentioned, in any case, I may see you there!

You gave me your e-mail address, which I assume is valid on INTERNET. I have access to OMNET, which may have some means to transfer messages to INTERNET, but I will need to discover how this is done before we can e-mail to each other.

Thank you for your letter of June 6, 1991 requesting information on our data archive, our electronic bulletin board system (BBS), and the UNAMAP evaluation..



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
ATMOSPHERIC RESEARCH AND EXPOSURE ASSESSMENT LABORATORY
RESEARCH TRIANGLE P
NORTH CAROLINA 277
July 8, 1991

Helge Rordam Olesen
National Environmental Research Institute
Frederiksborgvej 399
DK-4000 Roskilde
DENMARK

Dear Helge,

Thank you for your letter of June 6, 19
data archive, our electronic bulletin boar
evaluation.

1. Data Archive. This project (whic
ffort) resulted in the construction of se
urrently made available via our electronic BBS
have enclosed a package of documentation
tructure of the data sets. As you can see th
nly results to date. This is a continuing s
cience to archive classic data sets for othe
ncrease the data listings, or better yet, co
illing to archive data from many sources an
esearchers.

phone number (919)541-1325. The second, ca
regulatory counterpart within EPA, phone number
research models (not accepted for general ap
decisions), as well as our few archive data sets
BBS you will find you are calling into a very
interest areas, where air quality dispersion
SCRAM. The SCRAM BBS is much larger and mo
provides all of the air quality dispersion mod
modeling, as well as documentation, examples,
interested.

3. As the SCRAM BBS has evolved, many o
to allow them to be run on PC's. However, most
corrections and associated documentation. We ha
friendly menu data entry front-ends for the mo
private community. In summary, the model code
systems, but if you are looking for user-friend
vendor function, for now.

My Division Director, Frank Schmermeier, has been discussing with me the possibility of my attending the planned NATO CCMS meeting in Greece, in order to participate in the round table discussion on 'urban meteorology'. Is there more than one round table discussion? Perhaps this is the same discussion you mentioned, in any case, I may see you there!

You gave me your e-mail address, which I assume is valid on INTERNET. I have access to OMNET, which may have some means to transfer messages to INTERNET, but I will need to discover how this is done before we can e-mail to each other.

Data Archive.

This project (which was intended to be an ongoing effort) resulted in the construction of several ASCII data sets that are currently available via our electronic BBS...

As you can see, the initial results are the only results to date.

This is a continuing sad comment on the ability of our science to archive classic data sets for other users. Perhaps someday we can increase the data listings, or better yet, contribute our holdings to a group willing to archive data from many sources and make them easily available to researchers.

SCRAM BBS (Bulletin Board Service)

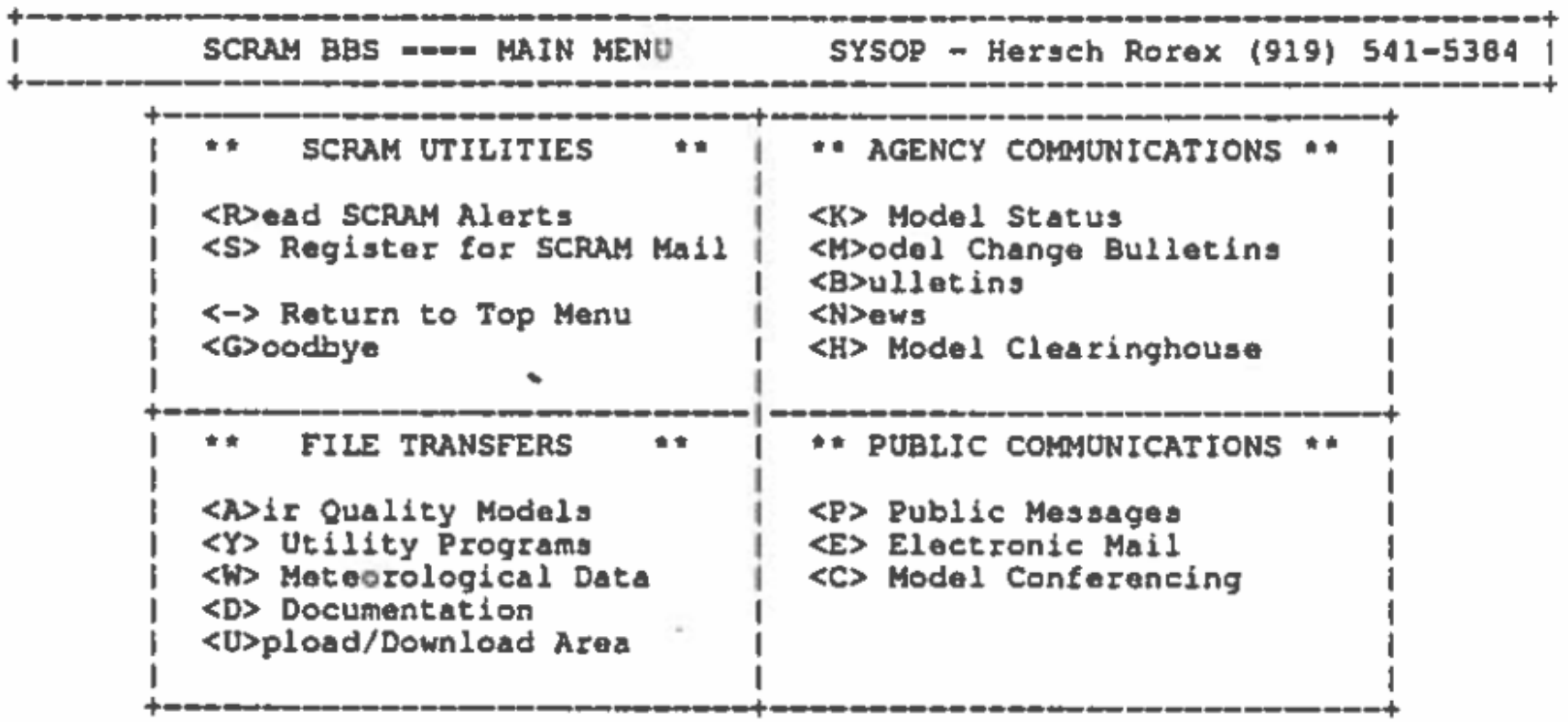


Fig. 1

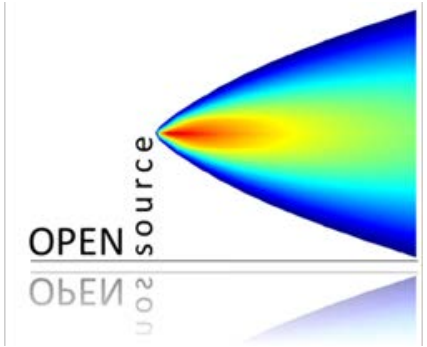
Quite a contrast to today...

Today – plenty of powerful webservices

Google

Google scholar

WIKIPEDIA
The Free Encyclopedia



WEB OF SCIENCE™

delta

A tool for

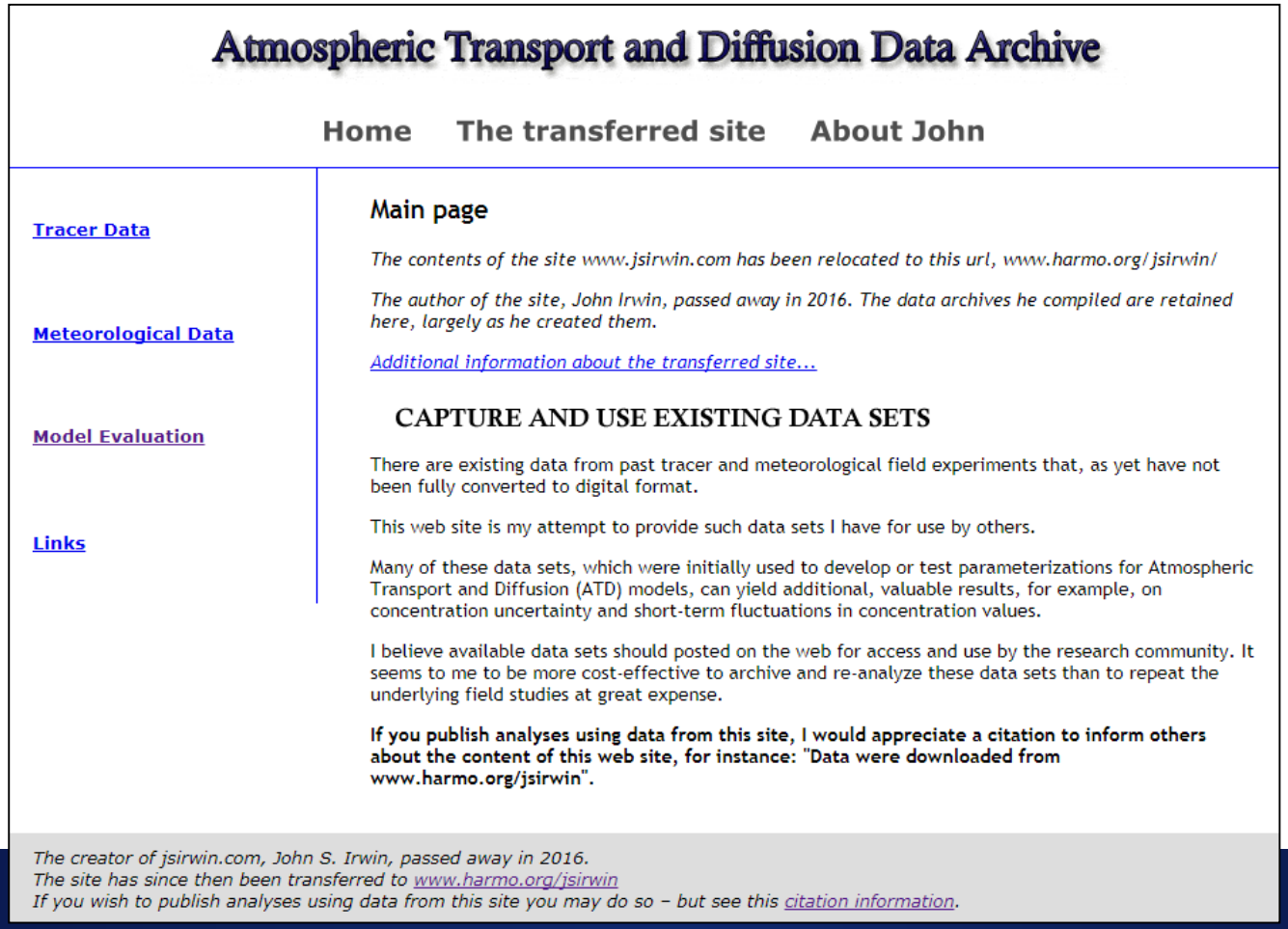
FAIRMODE
Forum for Air Quality
Modelling in Europe

The fate of classic data sets

John Irwin

- John Irwin established a web site around 2010:
- *Atmospheric Transport and Diffusion Data Archive.*
- Some quotes from the web site:
- "There are existing data from past tracer and meteorological field experiments that, as yet have not been fully converted to digital format.
- This web site is my attempt to provide such data sets I have for use by others.
- Many of these data sets, which were initially used to develop or test parameterizations for Atmospheric Transport and Diffusion models, can yield additional, valuable results…
- I believe available data sets should posted on the web for access and use by the research community. It seems to me to be more cost-effective to archive and re-analyze these data sets than to repeat the underlying field studies at great expense."

John's archive is now at: www.harmo.org/jsirwin



Atmospheric Transport and Diffusion Data Archive

Home The transferred site About John

Tracer Data

Meteorological Data

Model Evaluation

Links

Main page

The contents of the site www.jsirwin.com has been relocated to this url, www.harmo.org/jsirwin/

The author of the site, John Irwin, passed away in 2016. The data archives he compiled are retained here, largely as he created them.

Additional information about the transferred site...

CAPTURE AND USE EXISTING DATA SETS

There are existing data from past tracer and meteorological field experiments that, as yet have not been fully converted to digital format.

This web site is my attempt to provide such data sets I have for use by others.

Many of these data sets, which were initially used to develop or test parameterizations for Atmospheric Transport and Diffusion (ATD) models, can yield additional, valuable results, for example, on concentration uncertainty and short-term fluctuations in concentration values.

I believe available data sets should posted on the web for access and use by the research community. It seems to me to be more cost-effective to archive and re-analyze these data sets than to repeat the underlying field studies at great expense.

If you publish analyses using data from this site, I would appreciate a citation to inform others about the content of this web site, for instance: "Data were downloaded from www.harmo.org/jsirwin".

The creator of jsirwin.com, John S. Irwin, passed away in 2016.
The site has since then been transferred to www.harmo.org/jsirwin
If you wish to publish analyses using data from this site you may do so – but see this citation information.

TRACER DATA SETS

I have listed all the data sets that I have and intend to eventually post availability to by way of the web site. Links will be shown for those data sets that I currently have available.

Dispersion from a near-surface release (rural):

1. **Round Hill** (1954/55 and 1957, SO2), (Cramer, Record and Vaughen, 1958)
Ten minute samples of sulfur dioxide along three arcs (50, 100, and 200 m) downwind
release. The release height for the 29 experiments in 1954/55 was 30 cm and for the
1957 was 50 cm. Receptor height was 2 m. Site roughness was greater than 10 cm.
were taken on three arcs (50, 100, and 200 m). A unique feature of the 1957 experim
sampling was conducted for the first 0.5 min and 3-min of the 10-minute sampling pe

2. **Project Prairie Grass** (1956, SO2), (Barad, 1958; Haugen, 1959)
Project Prairie Grass included 68 10-minute samples at 1.5 m along five arcs, 50 to 80
from a point source release of sulfur dioxide 46 cm above ground. The 20-minute rele
conducted during July and August of 1956, with an equal number of cases occurring d
and nighttime. The sampling was for the 10-minute period in the middle of the 20-mi
roughness was 0.6 to 0.9 cm.

3. **Green Glow** (1959, uranine dye), (Fuquay, Simpson and Hinds, 1964), (Nickola, 1
Thirty minute releases of zinc sulfide were sampled along 6 arcs (200, 800, 1600, 320
25600 m) downwind of a point source release typically 2.5 meters above ground. Sam
performed starting before and ending after the tracer cloud passed through the samp
provide total dosage amounts. Receptor height was 1.5 m. Site roughness was 3 cm.

- Round Hill
- Project Prairie Grass
- Green Glow
- Hanford-64
- Hanford-67
- Cabauw
- Kincaid
- Bull Run
- Minnesota 1973

A moral of the story

- The fact that this archiving and publication of data has occurred as a private initiative exposes some of the missing links in the construction of our "anthill".

- It is important to allocate sufficient resources to secure experimental data for the future.

John's web site – model evaluation

- In addition to data the web site contains advice and warnings concerning model evaluation.
- The essence is that we should keep in mind that **concentration measurements are results of stochastic processes, while models predict ensemble means**.

A collection of succesful activities...

Common tools – some examples

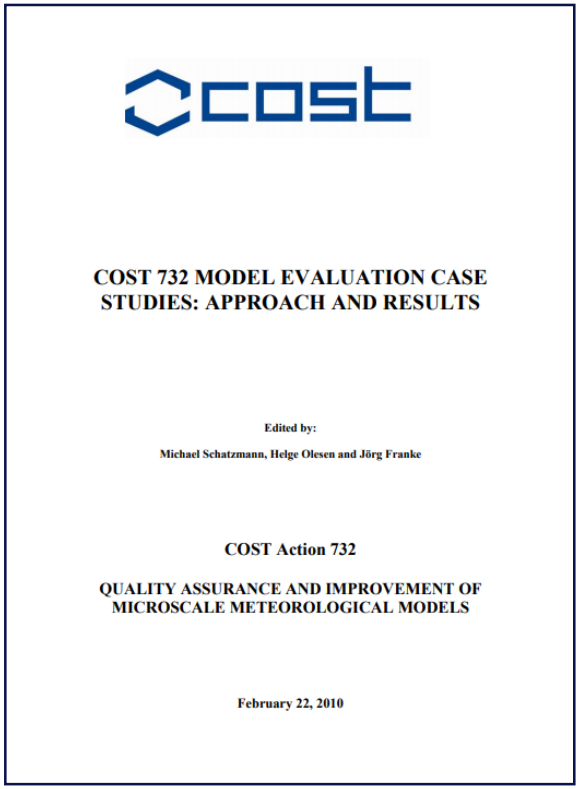
- The **"Model Validation Kit"** came in an early version for the Harmo workshop in Manno, 1993.
- It was consolidated over the following years, and used a lot in papers presented at the Harmo conferences. The BOOT software can be downloaded with it.
- The idea of the **FAIRMODE network** was launched at the 11th Harmonisation conference in 2007 (Moussiopoulos et al.). FAIRMODE has always interacted with the Harmonisation conferences. In the context of FAIRMODE several common tools have been launched. E.g.
  - The **Delta Tool**
  - **The Composite mapping tool**
  - plus several others...
- Harmo 18: We have heard about many additional tools of common interest.

Important lessons on model evaluation

- a glimpse into the work on model evaluation by the COST 732 action.

The MUST exercise of COST 732

- a demonstration of the power of exploratory analysis.



cost

COST 732 MODEL EVALUATION CASE STUDIES: APPROACH AND RESULTS

Edited by:

Michael Schatzmann, Helge Olesen and Jörg Franke

COST Action 732

QUALITY ASSURANCE AND IMPROVEMENT OF MICROSCALE METEOROLOGICAL MODELS

February 22, 2010

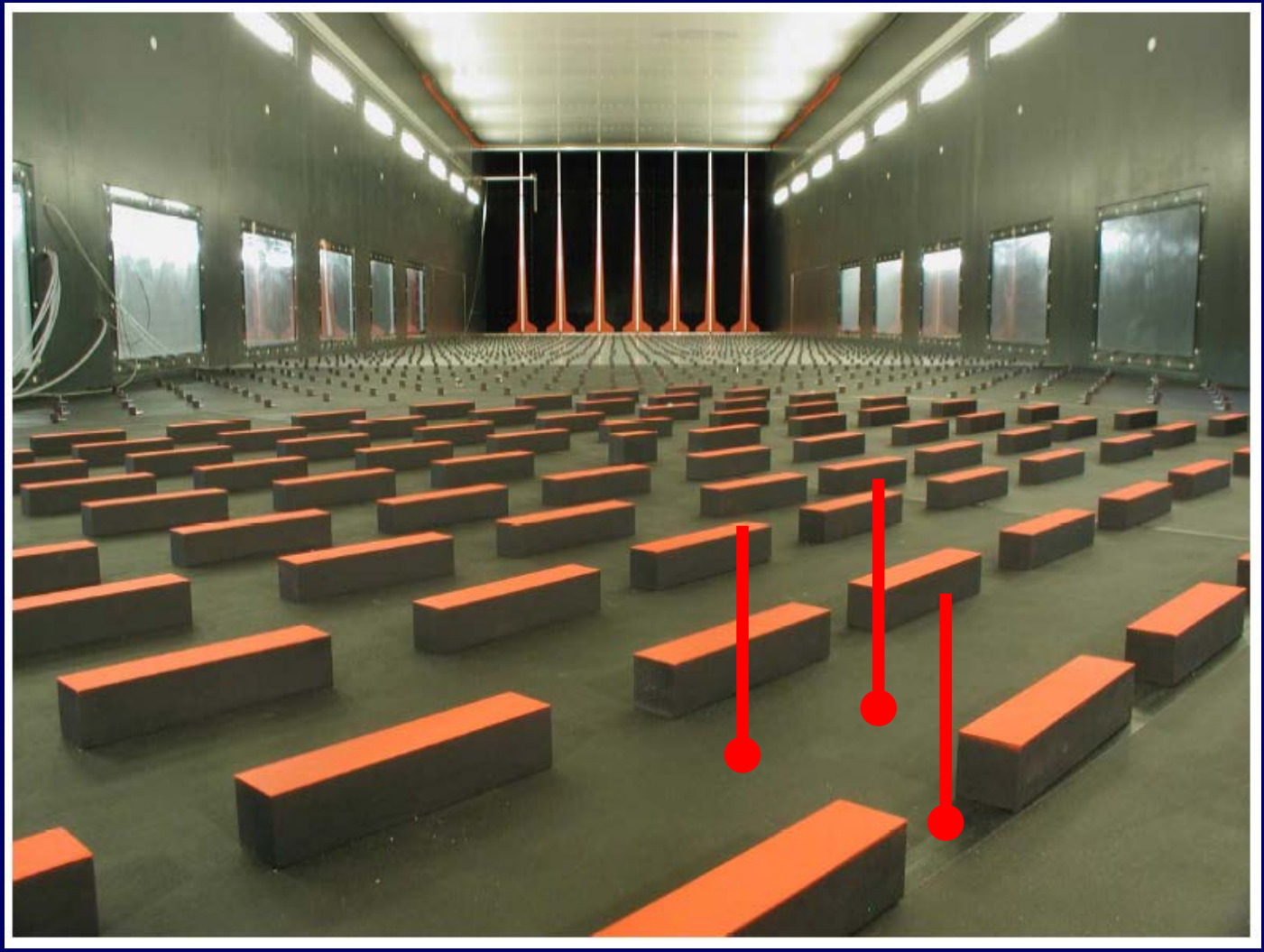
Examples from the MUST exercise

- Focus on results from CFD models
- The validation data were measured in the wind tunnel in Hamburg
- More than a dozen groups participated in a model validation exercise
- There was a common tool – a set of Excel workbooks, where the results could be placed in a common frame of reference.

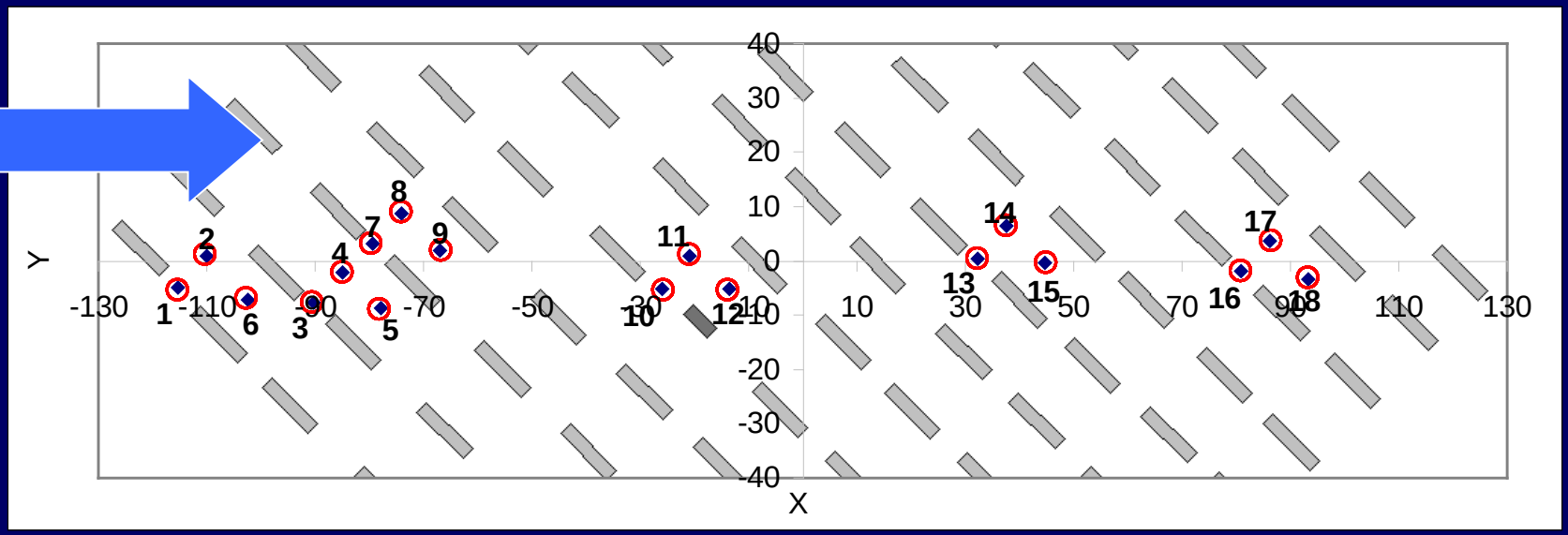
On example of the analyses

- Are the models capable of predicting the u component of the wind?
- We consider the -45 degree flow case with measurements at 18 ’towers’ (a vertical column of measurements) .

Minus 45 degree flow

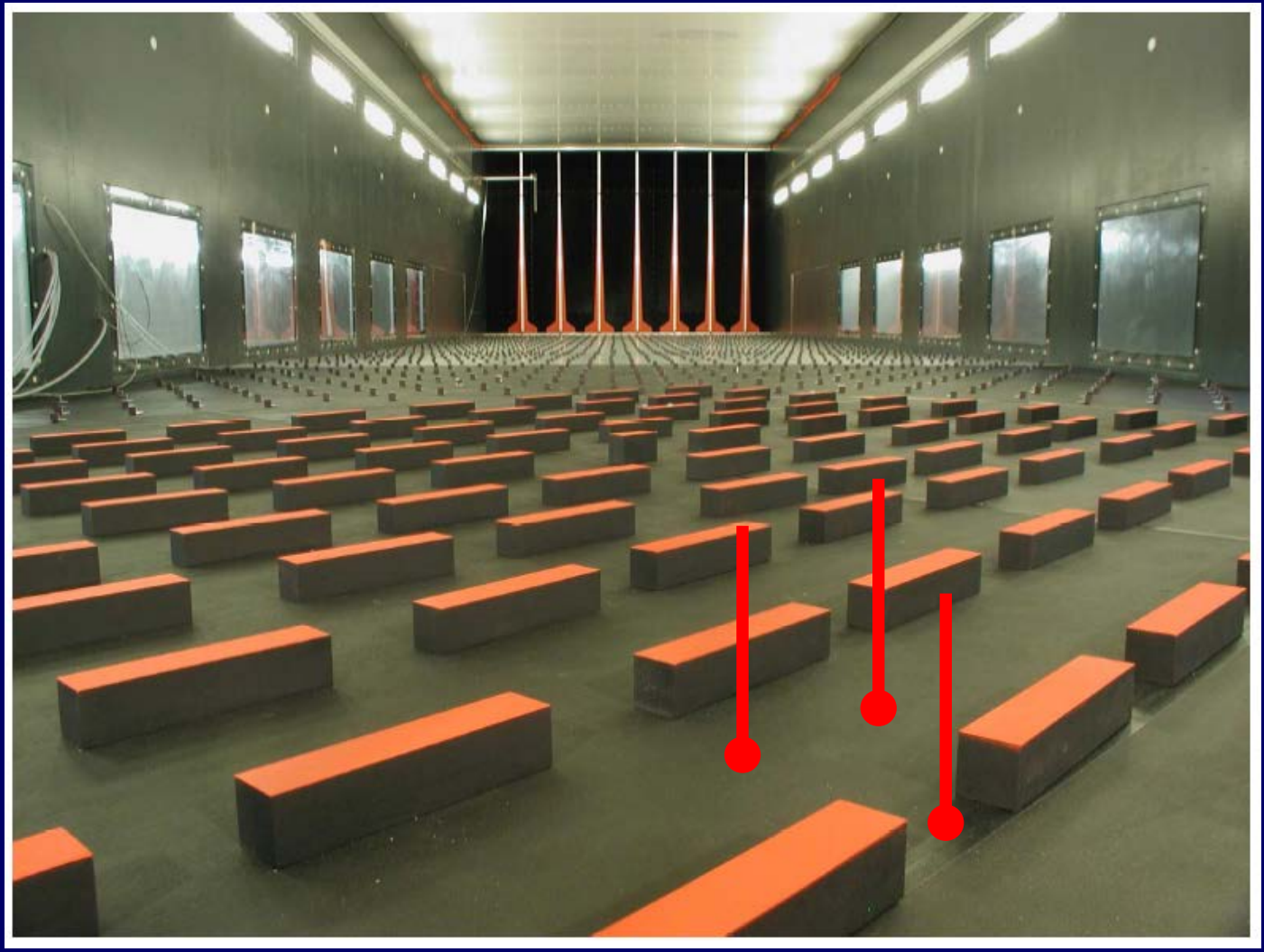


Minus 45 degree flow case – view from above

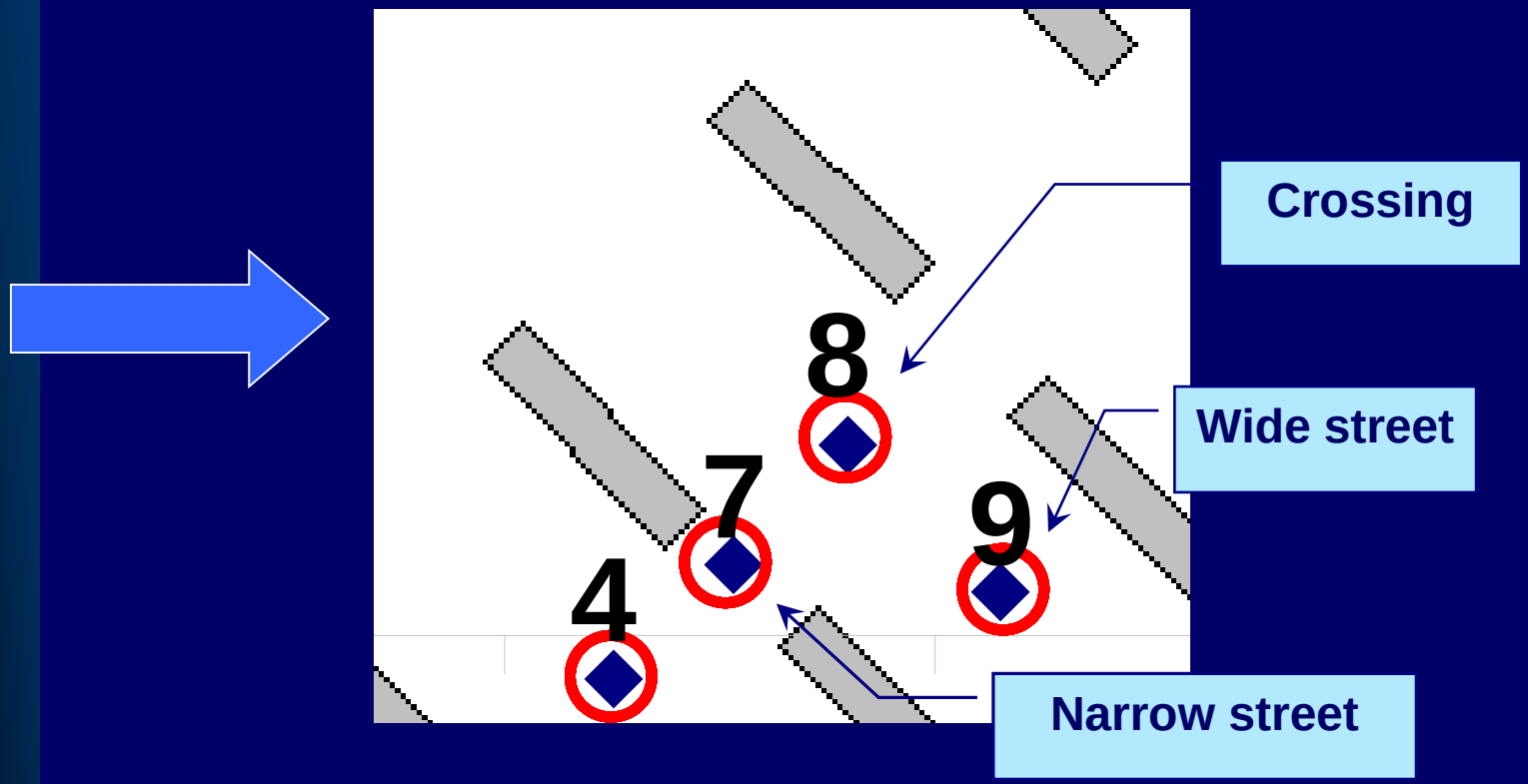


260 m

Minus 45 degree flow



- 45 degree flow

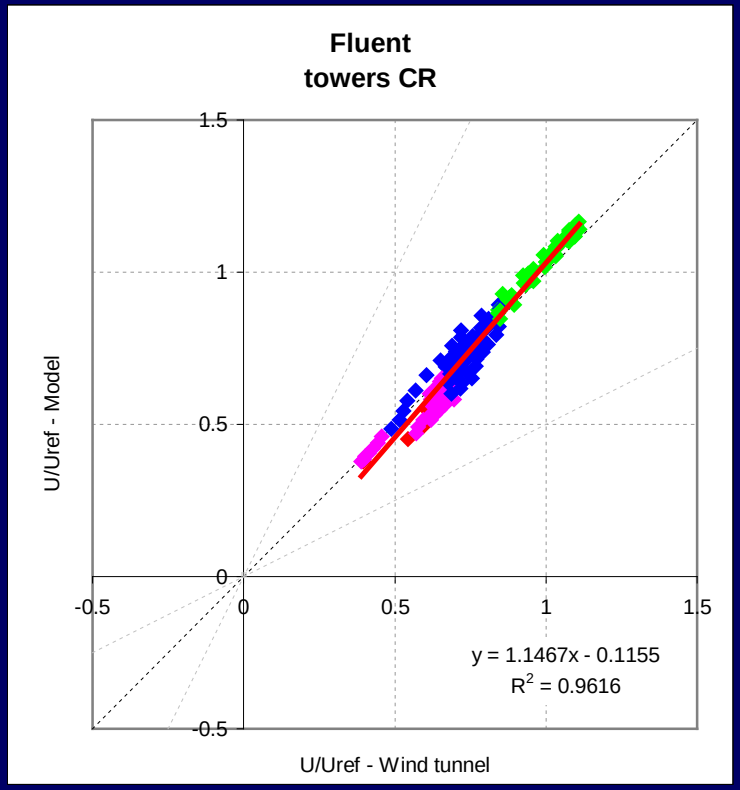


Note:

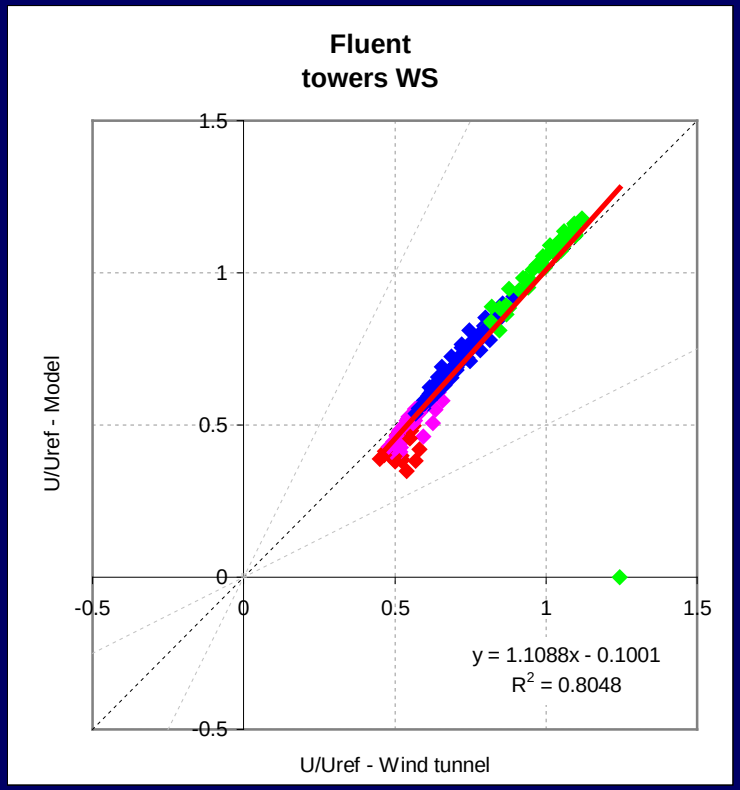
- There are different challenges, depending on where the tower is located - and the height above ground.

Comparisons of model results vs. measurements – first for one model

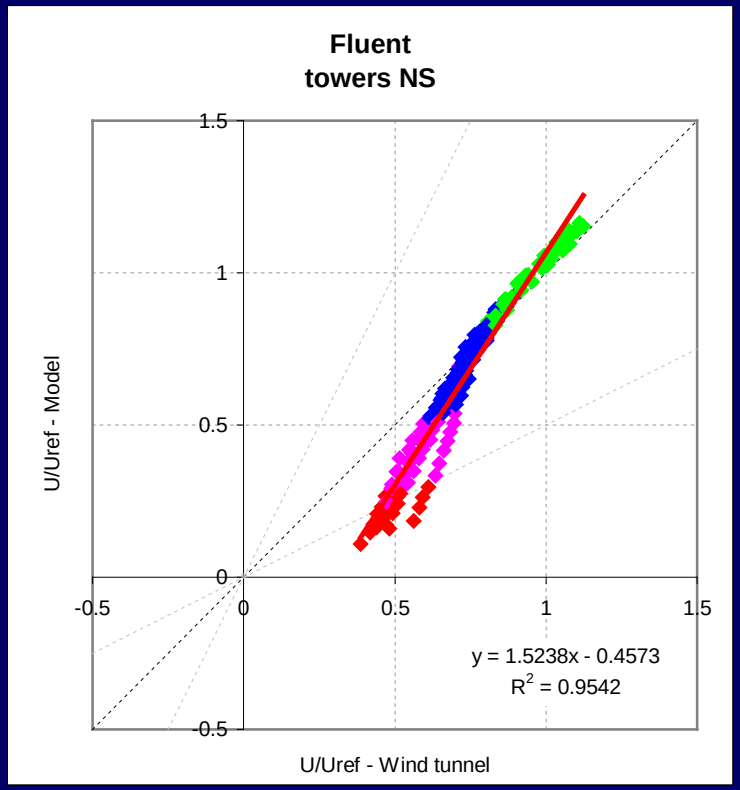
-45 degree flow, u component all heights - Crossings



-45 degree flow, u component, all heights - Wide Streets

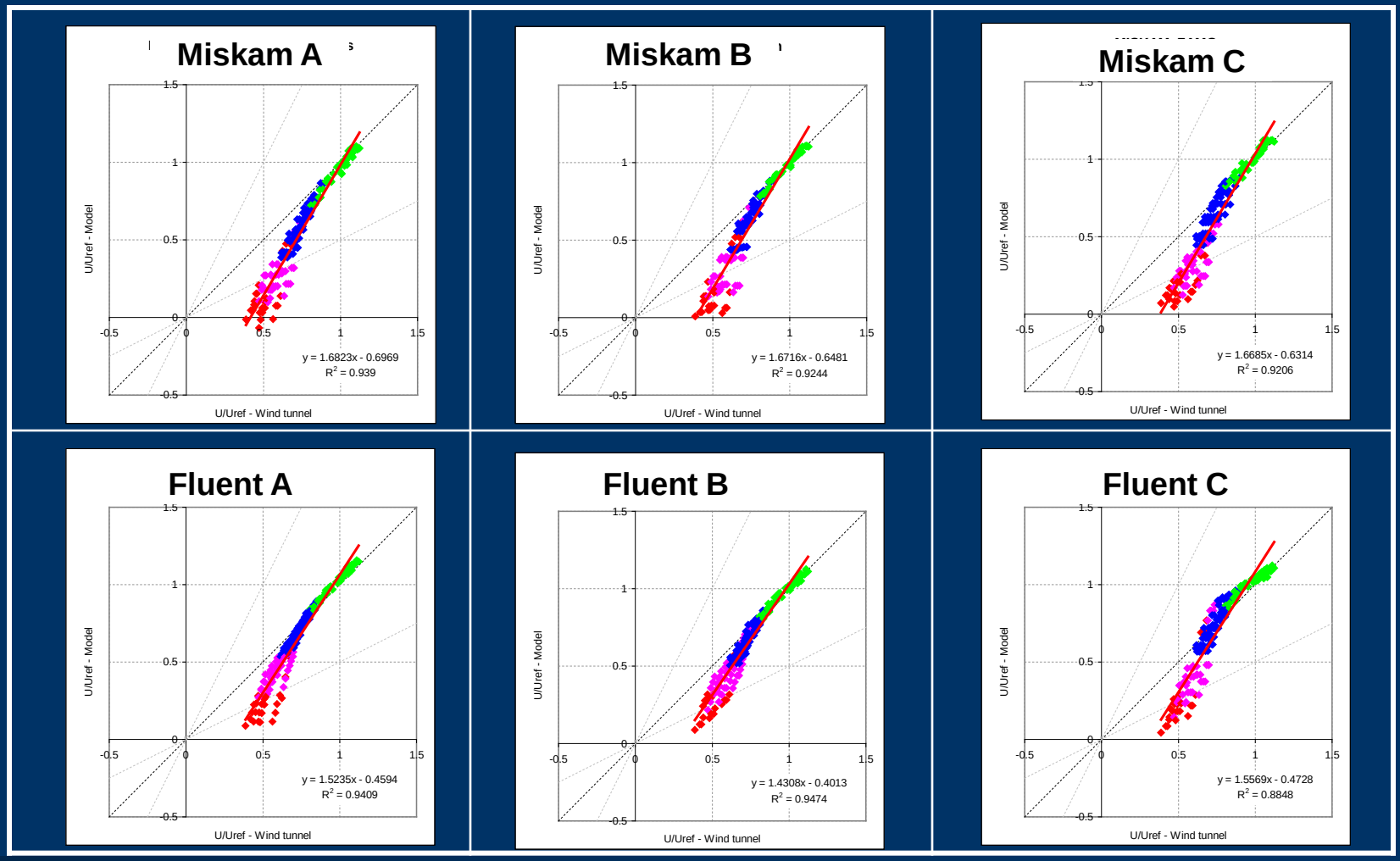


-45 degree flow, u component, all heights - Narrow Streets

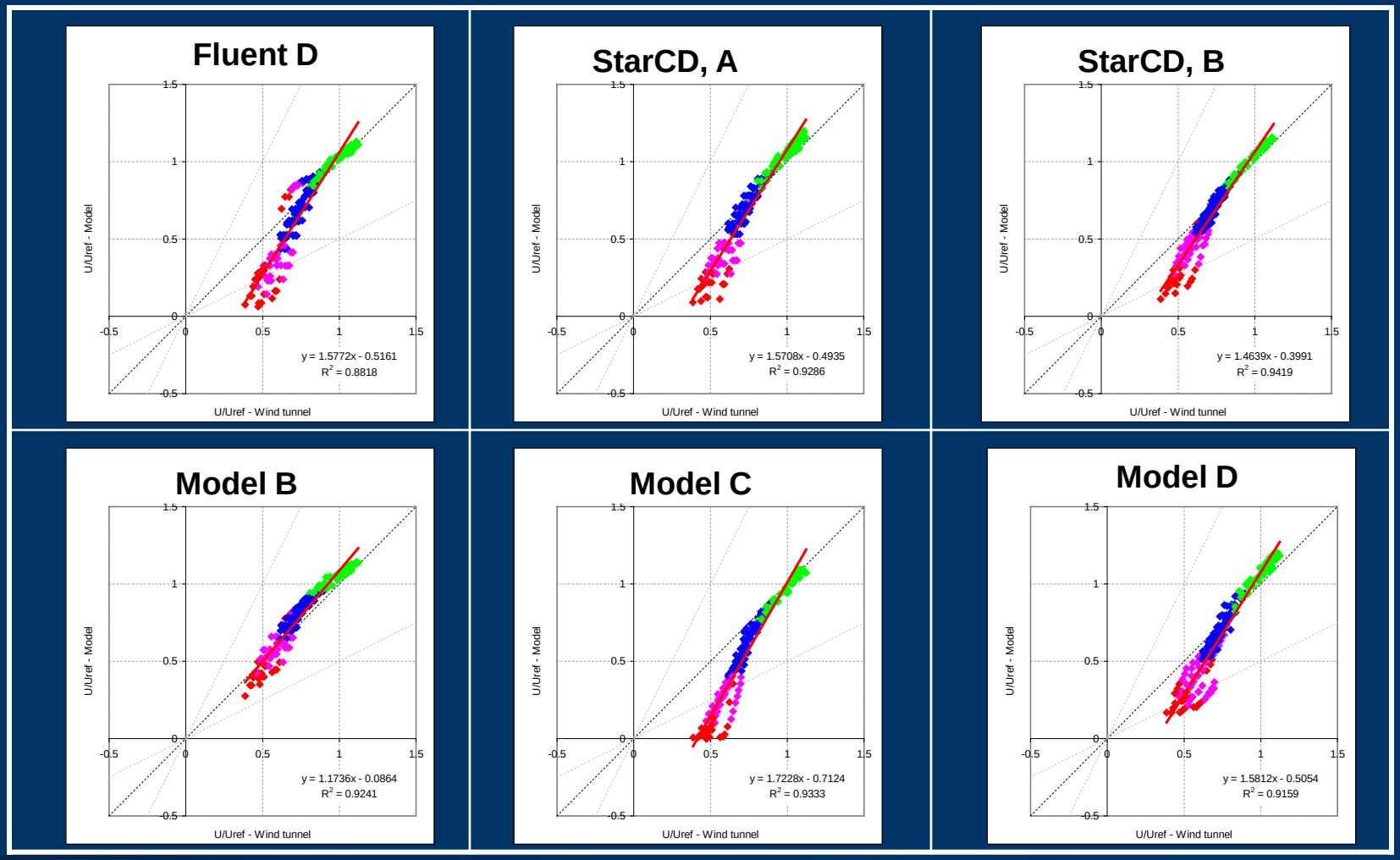


- **What is the state of the art for a number of models when predicting the u component for the - 45 degree case in Narrow Streets?**

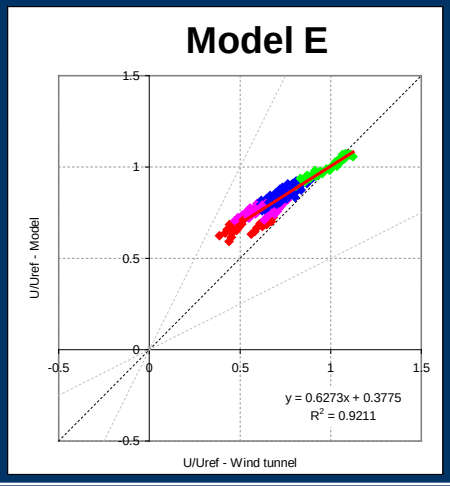
u component, several models – Narrow streets (panel 1)

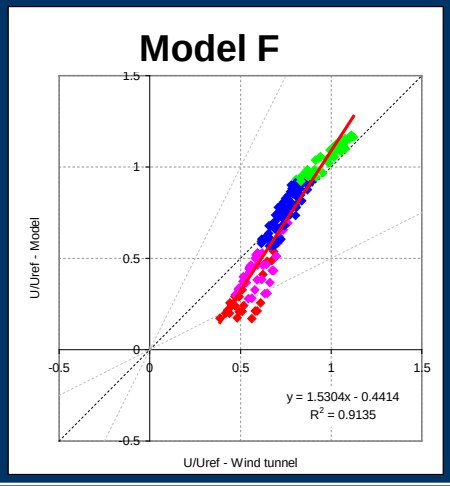


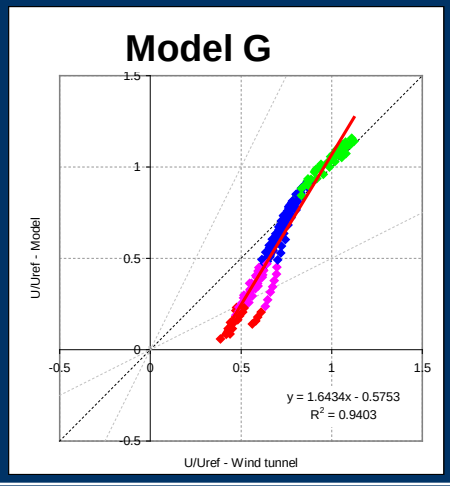
u component, several models – Narrow streets (panel 2)



u component, several models – Narrow streets (panel 3)







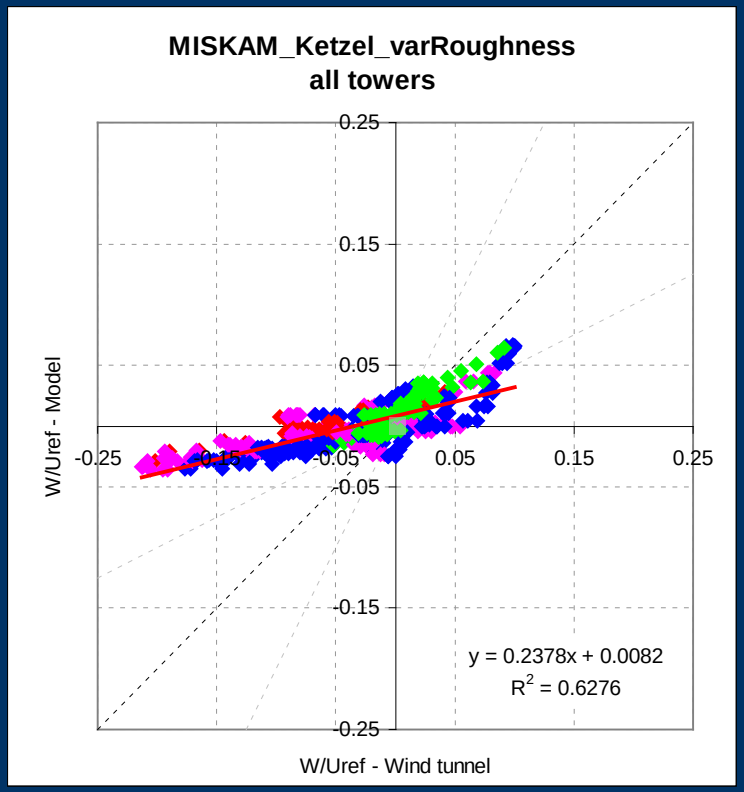
Common feature for models at -45 degree

- Narrow streets is too tough a challenge:
  u is underpredicted at low heights in ’Narrow streets’

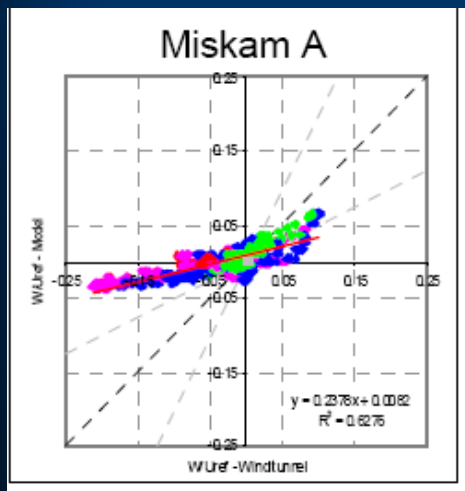
Are the models capable of predicting the w component?

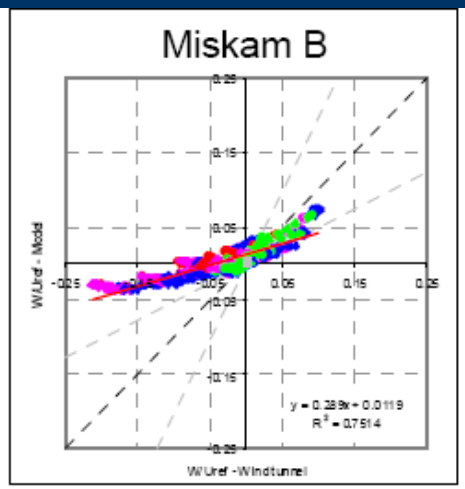
- Note: This is a difficult task. Vertical flow can go up and down, and the sign can vary even within a grid cell.

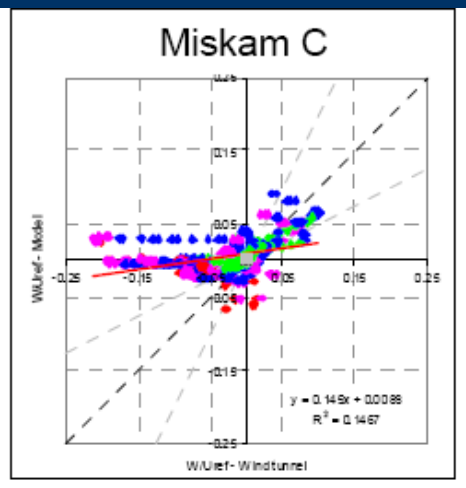
-45 degree flow, w component, all towers

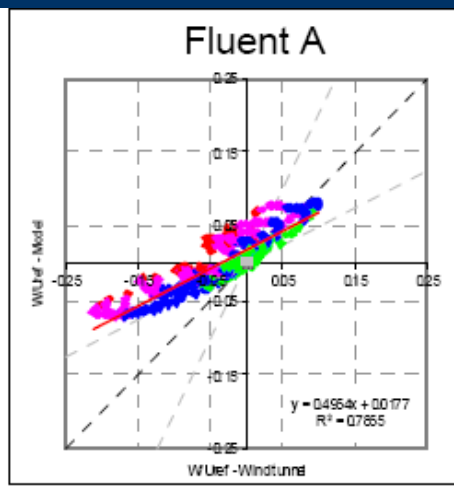


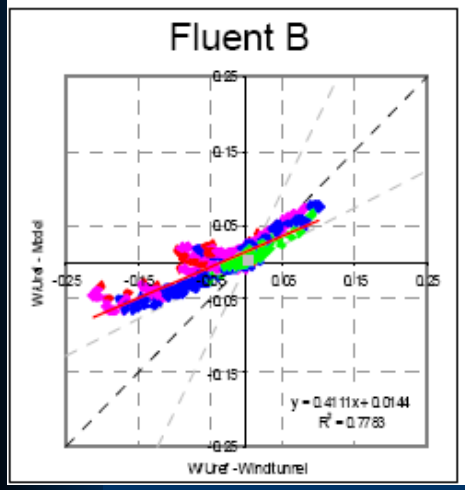
-45 degree flow, w component, all towers

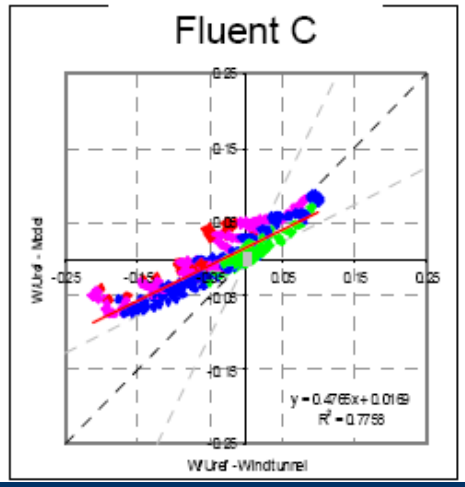


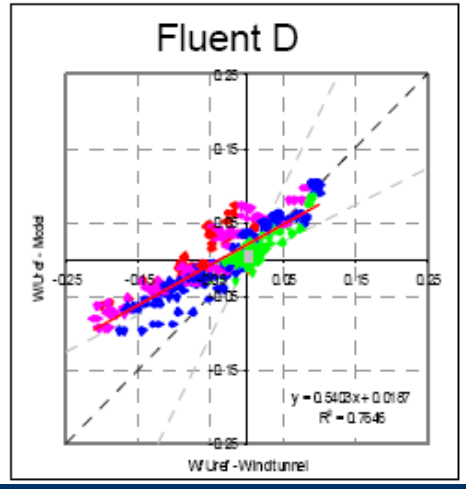


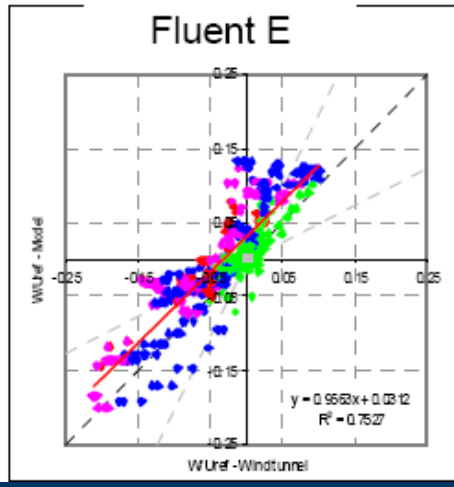




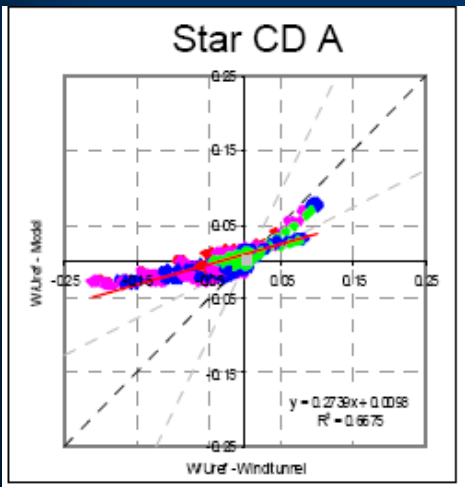


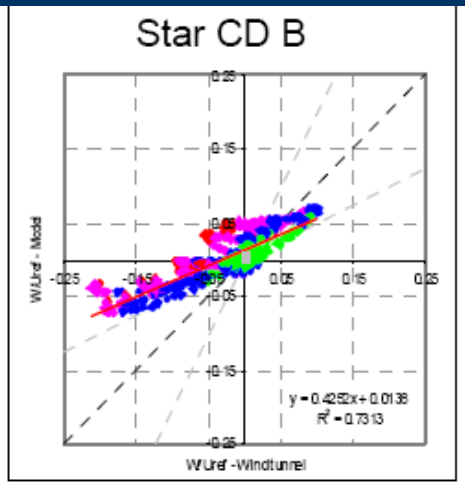


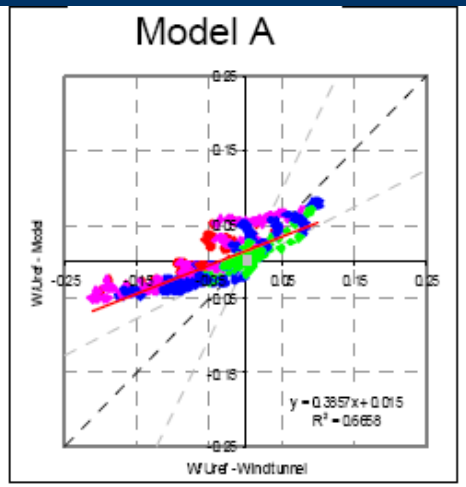


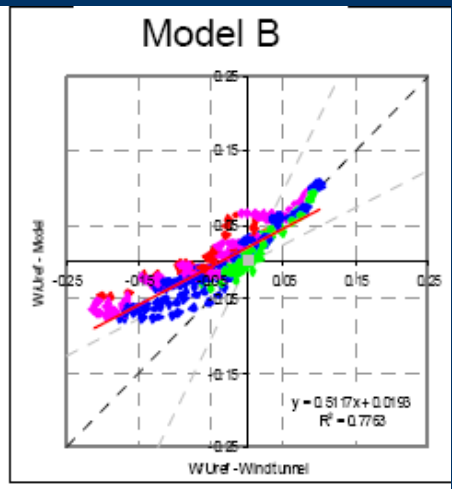


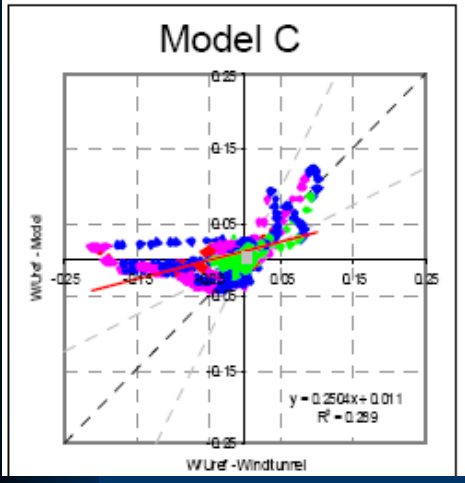
-45 degree flow, w component, all towers

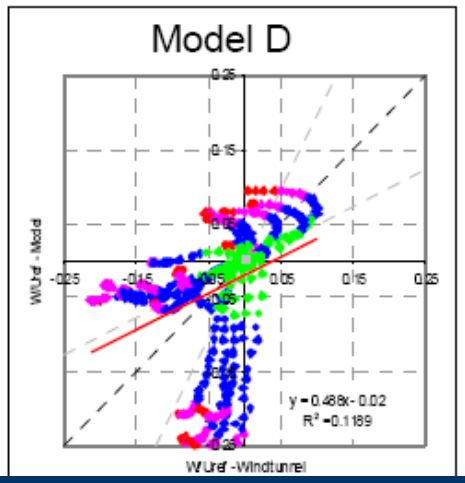


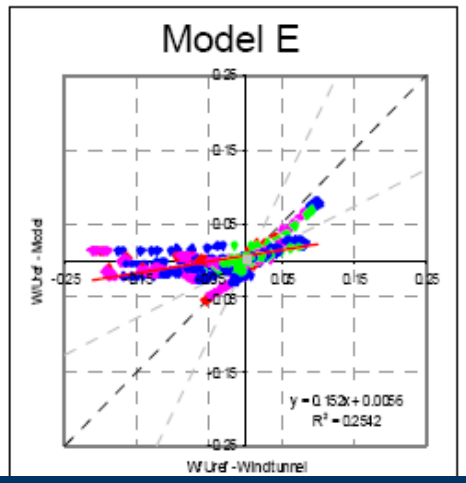


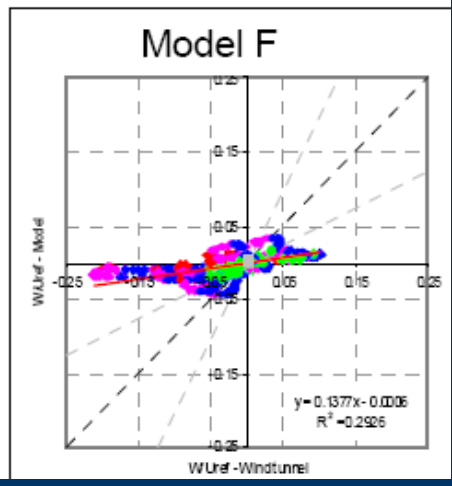












The power of exploratory analysis used on a group of models

- Similarities and differences stand clearly out, potential problems are revealed.
- An unusual pattern is often the symptom of some underlying problem (messed-up data, misplaced buildings, shifted coordinate systems)
- It is amazing how easily errors can be overlooked!
- Or inversely: How many problems you detect if you look at data and perform exploratory data analysis.

Main message

- **Exploratory data analysis is indispensable when you wish to assure quality!**
- **Look at data, explore them graphically!**

The Atmospheric Dispersion Wiki

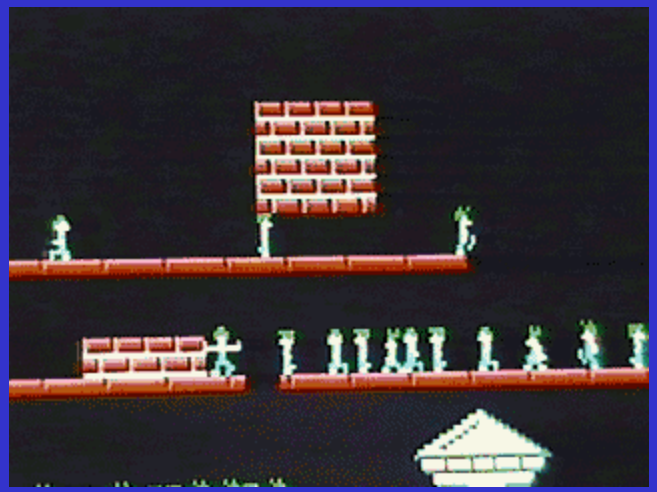
- A request for help. How can we fulfil the intentions behind the Wiki?
- Launched in 2005.
- The intention: An attempt to minimize the problem that researchers sometimes repeat others' mistakes, and that sometimes misconceptions can propagate.

The Atmospheric Dispersion Wiki

AARHUS
UNIVERSITY
DEPARTMENT OF ENVIRONMENTAL SCIENCE

HELGE RØRDAM OLESEN

12 October 2017



Wiki on Atmospheric Dispersion Modelling

- A Wiki provides something that we normally miss in the community of atmospheric dispersion professionals:
- An easy possibility to provide feedback and pool our experiences.
  This could be experiences with procedures, data sets and models related to our work.

Wiki on Atmospheric Dispersion Modelling

- The original ideas behind the Wiki:
- The Wiki seemed to be well suited to pool experiences on experimental data sets, because anybody can contribute with experiences.
- Warnings against pitfalls and common mistakes were of high interest.
- HOWEVER: **The wiki was no success – there were too few contributions to it.**

in: *Data set, Model evaluation*

Forum for individual data sets

See also:

Experimental data sets: Top-level page in hierarchy on data sets.

Data set repositories: Lists *compilations* of data sets.

List of individual data sets: Lists links to information on *individual* data sets.

The present page is the entry to open forums on the present Wiki where users of a data set can report their experiences.

At present, there are a few such forums. These can serve as examples.

You can create a new forum for any data set. Start by adding an entry in the alphabetic list below. The sample entry AAA may serve as a model for you to do so. After having added the entry to the list, create a page with information.

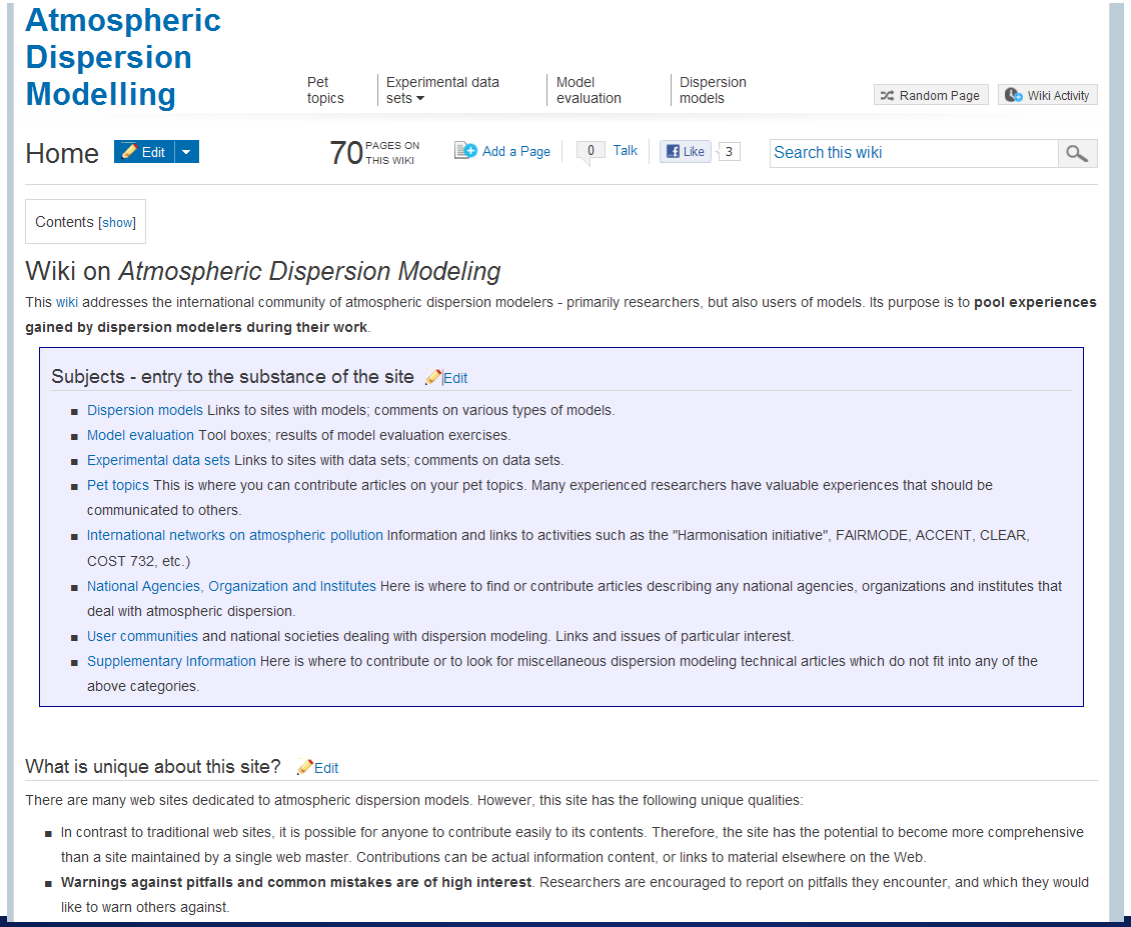
Note: In order to edit the present page you must be a registered user - see Please identify yourself !. Please follow the Rules of conduct when you add contents.

Alphabetic list of forums

- AAA A sample entry leading to a (non-existing) page on the present Wiki.
- Prairie Grass Page on this Wiki, discussing experiences with the classic Prairie Grass experiment from 1956.
- Thompson Wind Tunnel data Page reporting experiences with R.S. Thompson's data set from the US EPA wind tunnel (paper in Atmospheric Environment by Thompson, 1993). The data set systematically describes dispersion for a variety of building shapes, stack heights and stack locations. These data were originally used to estimate so-called Building Amplification Factor.
- **The MUST data set.** Concerns an array of containers at a military proving ground. The data set is used by the COST action called COST 732. There is more info in COST 732 forum

Categories: Data set | Model evaluation

Wiki on Atmospheric Dispersion Modelling



Atmospheric Dispersion Modelling

Pet topics | Experimental data sets | Model evaluation | Dispersion models | Random Page | Wiki Activity

Home Edit 70 PAGES ON THIS WIKI Add a Page 0 Talk Like 3 Search this wiki

Contents [show]

Wiki on *Atmospheric Dispersion Modeling*

This wiki addresses the international community of atmospheric dispersion modelers - primarily researchers, but also users of models. Its purpose is to **pool experiences gained by dispersion modelers during their work**.

Subjects - entry to the substance of the site Edit

- Dispersion models Links to sites with models; comments on various types of models.
- Model evaluation Tool boxes; results of model evaluation exercises.
- Experimental data sets Links to sites with data sets; comments on data sets.
- Pet topics This is where you can contribute articles on your pet topics. Many experienced researchers have valuable experiences that should be communicated to others.
- International networks on atmospheric pollution Information and links to activities such as the "Harmonisation initiative", FAIRMODE, ACCENT, CLEAR, COST 732, etc.)
- National Agencies, Organization and Institutes Here is where to find or contribute articles describing any national agencies, organizations and institutes that deal with atmospheric dispersion.
- User communities and national societies dealing with dispersion modeling. Links and issues of particular interest.
- Supplementary Information Here is where to contribute or to look for miscellaneous dispersion modeling technical articles which do not fit into any of the above categories.

What is unique about this site? Edit

There are many web sites dedicated to atmospheric dispersion models. However, this site has the following unique qualities:

- In contrast to traditional web sites, it is possible for anyone to contribute easily to its contents. Therefore, the site has the potential to become more comprehensive than a site maintained by a single web master. Contributions can be actual information content, or links to material elsewhere on the Web.
- **Warnings against pitfalls and common mistakes are of high interest**. Researchers are encouraged to report on pitfalls they encounter, and which they would like to warn others against.

Future of the Wiki

- It is no problem to let the Wiki continue its quiet life on the web for a number of years, but is there a better alternative?

- Can a different mechanism be found to serve the ideas behind the wiki? What can be done to minimize the problem that researchers sometimes repeat others' mistakes?

- To find the wiki:
  Search for " Wiki Atmospheric Dispersion" or go to
  http://AtmosphericDispersion.wikia.com

Future opportunities for the Harmo work

- *I am leaving the scene, but*
- FAIRMODE is providing tools.
- Many tools have been mentioned here at Harmo 18.
- We now have a multitude of tools on the web – something which was unheard of 25 years ago.
  Try to exploit their possibilities!

“Take home” messages (1 of 2)

- John Irwin’s data sets and other datasets are available through the Harmo web site www.harmo.org.
- It is important to allocate sufficient resources to **secure experimental data** for the future.
- Keep in mind that **concentration measurements are results of stochastic processes, while models predict ensemble means**.
- Provide and use tools that define a **common framework** for comparing models – such work is ongoing in FAIRMODE.

“Take home” messages (2 of 2)

- For in-depth quality assurance of models: **Exploratory analysis is indispensable**. Many lessons to be learned from the COST 732 action.
- Open-ended question: Can we establish **mechanisms to prevent researchers from falling into pitfalls**?